DESTINY IN TIME

NIR STRULOVITZ

Dedicated with love to all my furry friends.

They say that time heals a broken heart

But time has stood still since we've been apart

– I Can't Stop Loving You

KIRK: We haven't heard much from you about Omicron Ceti Three, Mister Spock.

SPOCK: I have little to say about it, Captain, except that for the first time in my life I was happy.

– Star Trek TOS (This Side of Paradise)

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Preface

I once read about a principle that when you're managing engineers, you first need to prove yourself to them in that technical field, before they would really accept your authority as a manager. I never managed anyone, but this idea resonates with me. I feel like I have to prove to you, the reader, that I know what I'm talking about before I ask you to trust me.

The special thing in this book is not the "what" it's the "how". Science fiction novels are dime a dozen with tall tales of higher dimensions, alien civilizations, parallel universes and time travel. But the technology simply "works", nobody troubles himself with how it works. So yes, you've heard it all before, but never like this. Here you'll get it with the underlying scientific basis. This book is heavy in theory, but in return you can figure it out yourself, instead of passively accepting that in the future people would have worked it out.

What I offer you here is a firsthand account of the first human who has actually been there and done that – me! I will describe the inner mechanisms to the best of my ability. unfortunately, I'm neither a scientist nor an engineer so there will be no equations, but instead I'll use words and metaphors. On the other hand, I promise there will be no technobabble, mystic forces or magic drugs.

I'll give you a simpler example which I hope will convince you to bear with me in the first few "hard" chapters. Before all this took place, I'd always get up in the middle of the night, feeling the emptiness because Myra – the only girl I ever loved – left me with no other reason except my non conformity to humanity's norms.

Years after she had gone, I never stopped aching for her with my whole being, my dick, my heart, and my mind. Technically of course they are all parts of my brain, the reptilian brain (the basal ganglia) missing the rough sex, the emotional brain (the limbic system) missing the warm love, and the reasoning brain (the cortex) missing her enchanting intellect. (see: Triune brain by Paul D. MacLean).

In these lonely nightly sessions, I would watch porn (usually Femdom Ass Worship), eat chocolate (usually Lindt Excellence dark chocolate), and listen to a song (usually Sa'eed by Infected Mushroom). These were my substitute for her love.

My point is that in all these you see the same principle of a demonstration of skill first, and from there on they have an artistic freedom to throw in any flavor of their choice. So I hope to do the same here, that's why the first few chapters will be my attempt at a technical tour-de-force.

Chapter 1 – Unspinning Hurricanes

It began when I was trying to solve the problem of hurricanes.

stopping tropical cyclone storms (also known as: hurricane, typhoon) early when they start to form, by interfering with the chain of events that creates them.

My approach is always to "nip in the bud" the problem before it's fully blown (pardon the pun). So, I read about how hurricanes start and how they develop.

In 2012 Popular Science published an article called "To Stop A Hurricane, Shoot It Full Of Dry Ice?" by Rose Pastore. in 2017 the National Geographic published an article called "Can We Engineer a Way to Stop a Hurricane?" by Cynthia Barnett. they explained about "Project Stormfury" and earlier attempts and their inconclusive results, and about later ideas of cooling the warm seas that energize these storms.

I invented some different ideas that I will now present (one is close to "Project Cirrus" but more "focused"), arranged by order of "fail-safe" protections that backup one another:

Windtraps

(although the name is taken from my favorite sci-fi novel Dune, the idea is different, in the book they're catching humidity from the air).

In addition to saving lives and property in the USA, these windtraps will produce a lot of electricity which will cover some of the costs of running them. I read this article "Most Hurricanes That Hit The US Start in The Exact Same Location" in ScienceAlert by Fiona MacDonald, according to her, the hurricanes that hit the USA are made by the "African easterly jet". I'm not sure how reliable is that website, so I'm relying on Wikipedia.

The jet's maximum wind speeds are at a height of 3 kilometers.

How do we "harvest" this wind? the first step is to make a huge funnel. The entry of the funnel will reach the desired height of 3 kilometers. Unfortunately, we can't build buildings that high, so we will build the structure like a huge "fly tent", with a very large entry and very small exit. normally the fabric is held by a pole, but in our case, it will be anchored to a helicopter that will hover in the same place at the 3 km height.

a helicopter can hover in 3.169 kilometers so that's ok. As soon as it runs low on fuel, the helicopter lands, refuels and gets up again. To have constant "up-time" we arrange two

windtraps one behind the other, and coordinate their helicopters so that one is always flying.

By the way instead of one strong helicopter when can use a few smaller drones for the same task, and they can be powered with solar power (charged by day, fly by night). The fabric itself should be the same material which is used for parachutes - strong, light, durable to weather, and of course able to handle strong wind.

What will be in the exit of this funnel? We will build wind turbines that look like a long tunnel with a few propellers one behind the other. The end of the tunnel is open so the air can come out but now it's much slower.

Proto-cyclones

Here is a quote from a paper named "The Formation of Tropical Cyclones" by David J. Raymond from New Mexico Tech.

(The only source that I was able to find was Dr. Joanne Simpson: "Mesoscale Interactions in Tropical Cyclone Genesis")

Proto-cyclones first develop a vortex at middle levels in the troposphere.

Only then does a smaller surface vortex form beneath the mid-level vortex.

according to Wikipedia the altitude of the troposphere in the tropics is 18 km.

Normally drones can only reach 3 kilometers high, but an "unmanned gas balloon" can reach 50 kilometers. So if we'll connect a drone to one or more balloons I think we can get it to fly and navigate by GPS at the required altitude of 18 km.

What will be the most effective thing for the drones to do there? To answer this, we need to understand what the wind is doing there - a ring.

Here is a very nice video about Coriolis Force by Eric Snodgrass[1].

A short video explaining the Coriolis Effect starring several graduate students from the Department of Atmospheric Science at the University of Illinois Urbana-Champaign.

[1] https://www.youtube.com/watch?v=aeY9tY9vKgs

Watch what happens on minute 4:41 when Amanda (the African wind) is pushing the baseball (air) on the rotating merry-go-round (planet Earth) in a straight line, but the baseball (air) is getting back to here in a circle (ring of air) !

This ring of air when it closes enforces itself, gains "independence" and eventually descends down and "sits" on the ocean, like a torus or a bagel of rotating air.

We need the drones to disperse or redirect the air from the African wind, ideally before it closes a loop, or at least before it gains strength.

Since we need to locate these phenomena first through satellite images that will see the movement of the ring directly, or maybe indirectly by following the African wind moving clouds and spotting places where there's a sudden decrease in the linear wind speed - because that's where the ring steals the energy to do its thing. At night we can do it by infra-red, because I think at night the hurricanes won't form that much because the next stages require evaporation on the water surface (meaning Sun's energy).

So how will the little drones redirect the ring which can be a few kilometers in diameter? We can use the same trick we did before with the fabric tunnel, the drones will rise in close formation with the fabric folded and then will spread out themselves and this will unfold the fabric in the sky, and then maintain position. It doesn't have to be nearly as big as the funnel we mentioned earlier, I think a few tens of meters will do in the diameter of the entry will suffice.

Where will they direct the current? The most important thing is to destroy the ring (sounds like Lord Of The Rings - ha ha), so I suggest outwards is our best bet because it will disperse the ring. If we try to redirect the flow inwards it can short-circuit and create two rings, possible even tighter and faster! If we try to redirect it downwards, we might hasten the descent of the ring - which is the ring's ultimate goal - so we probably don't want to do that. If we redirect the ring upwards, it will eventually come back down. If we don't have the technology to control where we re-direct the currents, then a few different random directions are our next best bet (after the outwards option).

Note: there after the hurricane is already formed on the water there is a phenomenon of "eye inside an eye". See in Wikipedia "Eyewall replacement cycle". Since this only happens when the hurricane is already pretty strong, I don't think we need to worry, but we should check it out and it could tip the scales towards the different random directions option above.

"Secondary Circulation" (in-up-out-down)

Here is a paragraph from Wikipedia about Tropical Cyclones:

The three-dimensional wind field in a tropical cyclone can be separated into two components: a "primary circulation" and a "secondary circulation". The primary circulation is the rotational part of the flow; it is purely circular. The secondary circulation is the overturning (in-up-out-down) part of the flow; it is in the radial and vertical directions. The primary circulation is larger in magnitude, dominating the surface wind field, and is responsible for the majority of the damage a storm causes, while the secondary circulation is slower but governs the energetics of the storm.

If you can't imagine it - think of a slinky toy spring, and bring its two ends together, so it's a whole circle, not just half a circle as it normally is. If we trace our finger along the slinky this is the "primary circulation". But if we let a small ant walk on the circle, it will walk in and out in and out, which is the "secondary circulation".

This torus (bagel or doughnut shape) made by the "secondary circulation" is what keeps the flow of the "primary circulation" inside it focused and directed in a ring circle. It's like when you direct plasma with magnetic fields (See Tokamak in Wikipedia, the "To" part comes from the word for "toroidal" in Russian). Without this torus the ring will disperse and die out.

in Project Cirrus, an airplane dropped crushed dry ice into the clouds along the rainbands of the hurricane.

I think the inconclusive results were because you can't aim accurately when throwing things from a plane, so sometimes, by pure chance, it reached the optimal location - along the inside of the eye of the hurricane, next to the eyewall - and sometimes it didn't. Also, they tried to fight the storm when it was already very strong, and I recommend to tackle it when it's still small and weak.

How to target the exact location?

If we send flying drones in the air, they will not be able to fly through the storm. My idea is to attack the hurricane from below with "underwater drones", which are small robotic submarines with robotic arms. There are two types: ROV (Remotely Operated Vehicle) which is manual, and AUV (Autonomous Underwater Vehicle) which is automatic. Normally the ROV requires people close by. But we can't risk the people, so we can use one underwater drone or more that will stand in the middle between the people and the working robot and function as "radio repeater".

The ROVs AUVa will be deployed in a safe distance from the storm from fast powerboats, and then the robots will get closer to the whirlpool of the storm from underwater and encircle it, let's say for simplicity that we send 4 robots, and they position themselves to the north, south, east and west of the whirlpool.

Each robot will carry with it a payload of dry ice in the shape of a torus, tied with a rope to a "Closed Lifting Bag" (camel) that is designed for rapid deployment - it has a scuba cylinder mounted on the outside which contains sufficient air to inflate the bag. So, when the robot inflates and releases this buoy, the buoy leaves the robot and floats to the surface of the water, with the dry ice hanging from it in the water (dry ice is heavier than water).

If we manage to release the floating bags so that they float just outside the storm, the dry ice "weight" will be swept inside by the whirlpool currents, and if the rope is long enough (not much longer than the width of the eyewall), then the floating bag will be stuck outside, and the dry ice will be stuck inside, both of them very close to the eyewall. At this point of time, the dry ice is cooling the water in the exact position that is important for maximum effect of stopping the secondary situation.

If experiments will prove that there isn't enough surface area for the dry ice to cool the water, we can incorporate a more porous design (then a torus which only has one hole) to the dry ice block. As a last resort we can attach (in advance) a small hand grenade with a long-time fuse to the dry ice block, that will allow the dry ice to reach the optimum position before it explodes. Of course, then we can no longer hold it in position (there is nothing to hold anymore) and chances are we also ruined the floating bag.

Dragging to Equator

If all else fails we and this means now that the eyewall is strong now, so we can use that to our advantage.

When you read about the Coriolis force in Wikipedia it says:

The horizontal deflection effect is greater near the poles, since the effective rotation rate about a local vertical axis is largest there, and decreases to zero at the equator.

If you are curious why you can see a nice explanation in this video of Veritasium - Does Water Swirl the Other Way in the Southern Hemisphere?[2] - in minute 4:00

[2] https://www.youtube.com/watch?v=mXaad0rsV38

A hurricane can never cross the equator or it will die (it will not have Coriolis force). Of course, it can START in the lower hemisphere of the Earth and there it's usually called a cyclone, but then it can't cross the equator to the northern hemisphere of the Earth, so we can apply the same trick there.

So, the trick is to use the same underwater robots we used previously, this time to deploy a big and massive torus (bagel or doughnut) shaped "closed lifting bag" that we release from right under the middle of the storm. It will have a strong cable attached to it, that we will tie to a ship that will slowly drag the whole storm towards the equator until it dies out. The cable needs to be long enough as to not putting the ship at risk.

The weight of the lifting bag will bring it to the bottom of the funnel of the whirlpool, but its buoyancy will not allow it to sink to the bottom and exit under the storm, so it's stuck at the tip of the storm. We are just slowly pulling the tip of the storm and the whole storm will follow and come with us.

Chapter 2 – Magnetic Turbulence

Thinking about these storms above and below the water, allowed me to think about it as a metaphor.

An explanation for turbulence using magnetism in the fourth dimension (I don't mean time, I mean the fourth spatial dimension), which also solves the neutron lifetime discrepancy.

what kind of phenomena can we see in 3-D that we can't see in 2-D (in context of magnetism and/or turbulence) ?

An analogy for the fourth dimension

We'll start from the analogy:

Planet Earth is a 3-D ball, but let's assume that we are seeing only the phenomena in 2-D on its surface - the surface area of the sea. If there is a wave, we see that the wave is progressing forwards and backwards and sideways, in circles that grow larger and larger outwards.

So to see and understand a wave we don't need to understand 3-D. What do to understand 3-D for? For eddies (eddy, whirlpool, vortex). An eddy is in direction perpendicular to the surface. If someone only understands 2-D, he will see that the eddy has waves that begin to go in a circle and then "disappear" which is of course going downwards (in 3-D terms).

And from the analogy to our subject:

In the same way, according to my assumption, turbulence is a 4-D eddy, so we can't understand it using only 3-D.

please note: by saying 4-D I mean fourth spatial dimension; I don't mean time! If you count time as the fourth dimension, then wherever I write 4-D (fourth dimension) please read it as 5-D (fifth dimension).

We know from Poincare's conjecture that the universe has 4 dimensions and we are on the 3-D surface of a 4-D ball. This was proved mathematically by the genius Grigori Perelman in the years 2002-2003.

How can this be true, if we don't see matter appearing or disappearing (like the water that "disappear" below the surface of the sea when they go down in the eddy)?

My answer to this is that ordinary matter cannot get inside the fourth dimension, I'll explain why soon (it has to do with the electrical charge of our particles), but energy can enter, when it is in the form of magnetic energy.

Why am I saying this? What is so special in magnetic energy? Look at the other forms of energy: Gravitational field - starts at a certain point, and works in all directions to infinity; Electric field (there are two kinds plus and minus, but each of them) -starts at a certain point and works in all directions until infinity.

On the other hand, the magnetic field starts with a plus and attached to it there is always a minus (which doesn't happen in the other types of energy). So, our intuition tells us that if these two opposing poles of the magnet are always right next to each other, then most of the energy is wasted inside the magnet going from plus to minus inside of the magnet (where it is closest). But we know that the magnet doesn't get warm or anything. This means that our intuition isn't worth anything here, because we are used to 3-D. What happens in 4-D?

Let's return to the analogy:

Let's say we have an eddy in the water. What do we know from experience happens above the water (remember up is already in one more dimension than the 2-D surface of the water)? What happens is a matching and flipped eddy of the air, I'm saying flipped because the air is not sucked into the sea (otherwise there would be a lot of bubbles) but is instead going up away from the water level. A creature that understands only the 2-D of the water surface cannot predict and understand the air eddy (cyclone storm) at all and its mutual effect on the water, because it only focuses on looking at the water's surface.

please note: I know that in a real cyclone storm the rotation of the air is the cause of the rotation of the water which is the result, and not the other way around, but it's easier for me to explain the metaphor this way.

Now back from the analogy to the subject:

Let's assume that the magnetic energy doesn't just go from plus to minus inside the magnet, but instead when we are creating a magnet in our 3-D world, then an opposite magnet is automatically created in the fourth dimension (like the eddy in the air).

The magnet in the fourth dimension is not directly "above" or "below" (ana and kata as Charles Howard Hinton said) in 4-D, but because of symmetry considerations it's spread around it in the fourth dimension. It's like when somebody is (heaven forbid) electrifies himself from the electric socket. He doesn't have to touch both the plus and the minus of the socket in the wall, but it's enough to touch one of them and the Earth which is a "universal reserve" of electric charge, being that it's the biggest body we have. So Earth can give and receive as many electrons as "needed" and it completes the electrification.

So in our world the positive pole of the magnet throws energy into the fourth dimension, and the magnetic energy goes in the fourth dimension to infinity (not to the negative pole next to it).

Back to the analogy:

It's like a buoy that oscillates (sway) a little up and down on the water, and so it creates ripples (waves) that spread around it to all sides on the surface of the water forever.

Back from the analogy to the subject:

In the same way the negative pole of the magnet gets energy from the infinity of the 4th dimension, and not from the positive pole that is right next to it.

Back to the analogy:

It's like a surface that was at first static on the water surface, but now because of the waves coming to it from different directions it's starting to oscillate (sway) up and down.

OK so so far, we only created a much more complicated model than what we have today, and we haven't explained anything extra so that the price of the added complication will give us some profit and will pay off.

Let's think about the connection between electricity and magnetism. We know that when we move an electrical charge inside a conductor (wire) we get a magnetic field. On the other

hand, when we move a conductor (wire) inside a magnetic field the magnetic charges inside the conductor move. But why is it so?

It's similar to the buoy that we talked about. If the electric particles are the buoy, and the magnetic energy is the sea waves, we understand why a movement up and down (in the extra dimension) is creating a dimension in 2-D and vice versa, why a movement in 2-D is creating a movement of the buoy - so with an extra dimension we explained the connection between electricity and magnetism!

Electromagnetic waves (radio waves)

Now let's think about electromagnetic waves (radio transmission for example). When we move the electricity particles inside the conductor back and forth fast (the wire becomes an antenna) the direction of the magnetic field doesn't have enough time to turn over and radio waves are created.

In the opposite direction, when radio waves reach another conductor (another antenna) they move the electric particles inside that conductor back and forth and we can listen to what was broadcasted for us.

What is the analogy of radio waves in our marine metaphor?

In the common explanation the radio waves movement are similar to the following air and water movement:

suppose there is water in the direction from north to south over a lake; what will happen to the water? the water will form waves which also move from north to south. now as a result of the flowing of water from north to south, a little water which had no time to move are pushed to the sides, towards east and towards west. What is this small amount of water movement causing? A little movement of air above them, also in the direction to the east and to the west. The little movements eastwards and westwards, will create even smaller movements north and south of their own, and so on, length and breadth, the air and water effect one another, each time in 90 degree angle to the original movement.

We know that the electrical and magnetic field that alternately create each other in radio transmissions are also perpendicular to each other.

As we understand the metaphor, this mechanism loses energy (decays) very fast, and becomes smaller and smaller movements.

Let's think of another mechanism for radio transmission.

Suppose we have an eddy (swirl) in the air, that creates an eddy (swirl) in the water. Let's say we have another eddy in the air created not far away from there, which rotates in the opposite direction, and that neighbor air eddy also creates an eddy in the water - a neighbor eddy water in that opposite direction. Let's say the first pair of "air and water" eddies rotates clockwise, and the second pair of eddies "air and water" are rotating counter-clockwise. If the two eddies in the water come close to one another, they can connect.

You can try this with the palms of your two hands. Hold your hands a little bent in front of your chest, with the palms facing downwards. now rotate your palms in circles, as if you are a DJ (Disc Jockey), one hand in one direction (let's say your right hand clockwise) and the other hand in the opposite direction (let's say your left hand in counter clockwise direction). Your two palms are the two eddies inside the water. now continue to rotate your hands, and at the same time, slowly turn them towards each other (as if you want to clap your hands). So you will see that the eddies support each other and strengthen each other.

If the air neighboring air eddies connect between the same pairs that were connected in the water, then we didn't do anything, we just formed a ring. So if we have a lot of these they're just a lot of separate rings. But what if the pairs of air eddies and water eddies connect alternately? Then it looks like a needle that pulled a thread in "warp and weft" form, one time above the fabric and the next time below the fabric, and the thread is continues, which means the eddy continues and supports itself from end all the way to the other end which can be very far.

So I think this kind of mechanism is much more stable, and this creates radio broadcasts. The fields are not perpendicular to one another in 3-D but in 4-D.

Why don't we see continues storms like these in the ocean that look like a snake that goes above and below the water back and forth?

Because they will suck energy from one another, because there is not enough separation between them. Before you turn your palms towards one another like you want to clap, if the hands of the DJ are rotating each one on another record, one hand clockwise and the other hand counter-clockwise, the air or the water between the hands will not know where to go, and so the hands will disturb one another.

As opposed to this, the fourth dimension is creating the necessary separation so that the hands will not interrupt one another. The electrical charge can't pass (I will soon explain why, because of the random movement of the electron which is a result of the "Heisenberg's

uncertainty principle") the barrier to the fourth dimension, but the magnetic force of the "mirror world" does work in the fourth dimension, and what goes back and forth is in fact a sea eddy (magnetic force of 3-D) into an air eddy (magnetic force of the "mirror" 4-D). When there is no movement of the buoy (electrical charge) unless we run into a buoy again (the next antenna).

This also explains why we can transmit radio waves in vacuum, because there is no need in electrical particles. The current (the one we use now) theory doesn't explain this, because even if we created a magnetic field, how do we (further down the road) create an electric field if we don't have electrical particles?

OK so this by now is a decent profit that we get from the new theory, we explained the connection between electricity and magnetism using the fourth dimension, and we explained radio waves using the fourth dimension.

Now let's explain something a lot cooler which is turbulence.

First of all, we notice that energy lines are clean and smooth, except in situations of chaos like the "three body problem" which we might explain later. But normally they are clean and smooth, and turbulence is created where there is matter like in a river flowing (water particles) or in air flow (air particles).

So now with the new theory we understand that turbulence doesn't happens with just any matter particles, but with the ones who have within them electrical charges. The electrical charges are balanced, because within each atom or molecule there is already electrical balance between protons and electrons, but it is important that the atoms or molecules have within them electrical sub-particles.

So how is turbulence created?

We are going back to our marine metaphor:

Let's say we have a smooth (laminar) flow of water. but the water particles have a tiny random motion because of the uncertainty principle. Otherwise we would know exactly where they are. So we can compare this to small fish that swim with the water, but also flipping their fins and create random waves in different directions. If only the water world existed, then even if the effect of the small fish would combine initially ti the beginning of a small eddy, this eddy would soon grow weak, because there isn't anything that will hold and sustain this random effect of the little fish.

But now the fourth dimension comes into play. Remember that when there is an eddy inside the water, there is a parallel eddy in the air (the fourth dimension) and there it has a certain persistence of its own. So in time there form in the smooth current tiny eddies that last longer than a split second. Some of them last long enough to join between them into bigger eddies. This is what we see in turbulence.

In my opinion if we will make a flow of particles that don't have within them the little fish, meaning that they don't have electrical charge inside them, like neutrons, then we will see that their flow isn't causing turbulence. This will be the parallel of the super conductor of electrical energy, but here it's mechanical energy.

This is unfortunately only theoretical because outside the nucleus, the neutron decays in beta decay and becomes a proton, an electron, and an anti-neutrino.

https://en.wikipedia.org/wiki/Free_neutron_decay

But maybe there is a kind of particle which is neutral and doesn't disintegrate, and then we can use it as the perfect hydraulic liquid that can operate a "hydraulic press" without any resistance of its own, or the perfect pneumatic gas that can pass huge distances for example in a "pneumatic tube".

What is even cooler is that in my opinion these materials, which don't have electrical inner parts that move (right, inside the neutron lie "hidden" the proton and the electron, but they don't move when they are inside the neutron), so they as oppose to us can enter the fourth dimension even though they are matter!

So why don't we see neutrons when they disappear into the fourth dimension, and we don't see neutrons appearing out of the blue (out of thin air), from the fourth dimension?

Well guess what? We do see such a thing!

neutron lifetime puzzle

https://www.nature.com/articles/d41586-019-01203-9

https://www.quantamagazine.org/neutron-lifetime-puzzle-deepens-but-no-dark-matter-seen-20180213/

https://science.sciencemag.org/content/360/6389/605

https://www.nist.gov/news-events/news/2014/02/toward-new-precision-measuring-neutron-lifetime

There is something called the "neutron lifetime puzzle" (or "neutron half-life discrepancy") which says that the life expectancy of the neutron is different in 8 seconds, depending on how you measure it. My guess is that one of the methods create a disturbance in the passage to the fourth dimension, and this is where the difference comes from.

When you put neutrons in a bottle and count them, neutrons live 14:39 minutes. When they pass in a ray tube (probably something like a Crookes tube) they live 14:48 minutes, which means 8 seconds longer.

So I think what happens is that the electrical voltage inside the tube effect how much the neutrons can pass to and from the fourth dimension. In the metaphor this can be for example like the temperature of the water affects the chance that a cyclone storm will happen. So if someone is limited to the surface of the water, it will appear to him that there is more water when there is no storm, because he doesn't see the water spray in the air. So if we have voltage in the ray tube, fewer neutrons can get lost to the fourth dimension, so we have more neutrons. So the scientists think that the neutrons live for a longer time. Because they exist in our 3-D more.

what does the fourth dimension look like?

So we'll finish with thinking what does the fourth dimension look like?

At the very least there is a magnetosphere of a lot things that we have here in 3-D :

https://en.wikipedia.org/wiki/Magnetosphere

But at the very most, there are things there like "neutron stars" or if these don't last long enough then "neutrino stars" (or other particles which are neutral and more stable) and maybe even living creatures that live there and are made of the same material!

Chapter 3 – Quantum Entanglement of P-adic kind

This in turn extended a view of an all connecting under-structure that I already developed thinking of quantum entanglement.

explaining quantum entanglement (what Einstein called "spooky action at a distance") based on "p-adic" numbers and ultrametric space.

As you probably know science today can't explain Quantum Entanglement.

I invented an explanation to the hidden mechanism behind Quantum Entanglement!

The problem - "spooky action at a distance"

If we "connect" (entangle) two small (quantum) particles in a special way, then after we "connected" them, we can separate them over very large distance, even two opposite sides of the universe,

but still each of the particles will "know" what happens to the other one IMMEDIATELY, in spite the fact that they can't communicate between them. (such communication would take them years).

Einstein hated it and called it "spooky action at a distance".

The solution - "common action at a proximity"

In a nutshell, my theory takes the "spookiness" out of the particles and puts it into the structure of space itself.

First of all please allow me to establish a few simple ideas that are unrelated to each other.

Later, we will build on these ideas some more complicated ideas and tie them together.

Metaphor I - Chessboard

The idea came to me from Richard Feynman's Lectures on Physics, Lecture 2 Basic Physics Section 1 - Introduction:

In the game of chess, if a bishop starts on light color squares, then it will be on the same light color squares throughout the chess game. If it starts on dark squares, it will always be on dark squares.

Metaphor II - Pixels

When I was a teenager, I liked to program graphics in DOS. Each tiny "square" of light on the screen is called a pixel. The screen resolution in DOS is very grainy: 320 pixels across, and 200 pixels down.

Let's say we want to rotate a point of light (pixel) around the center of the screen. We would hold the real accurate coordinates (floating point numbers with decimal precision) in the memory all the time,

Then we would do some calculations (sines, cosines) with these accurate floating-point coordinates, to figure out what is the next position for our rotating point, but not drawing anything yet.

Now we "translate" (round up or down) the accurate floating-point coordinates in the memory, into not accurate at all integer (whole numbers) coordinates on the screen, and we draw in the integers coordinates.

Metaphor III - Distorting mirror

You've probably seen a distorting mirror in a carnival fair "mystery room" or in a science museum "optical illusions" room. Let's think of a mirror that makes you look very tall and thin.

If we would hold a "measuring tape" or a ruler in front of that distorting mirror, we would see the number line "compressed" together.

We can think of another form of distorting mirror that is curved in its sides more than its middle, so it's distorting non-uniformly: the more you move to the side the more the numbers are close together.

P-adic numbers and ultrametric space

I'll try to explain here what P-adic numbers are, but do yourself a favor and read the friendly introduction in Wikipedia.

P-Adic numbers

In p-adic numbers, the closer you are the further you are, and the further you are the closer you are.

The world of p-adic numbers is "upside down" in the sense that instead of the difference,

we look at the reciprocal of the difference (one over the difference) like so:

Example I

With "normal" numbers, 0.005 is close to 0.004 because the difference is 1/1000 (one thousandth)

With "p-adic" numbers, 0.005 is far from 0.004 because the difference is 1000 (one thousand)

Example II

With "normal" numbers, 5000 is far from 4000 because the difference is 1000 (one thousand)

With "p-adic" numbers, 5000 is close to 4000 because the difference is 1/1000 (one thousandth)

Example III

With "normal" numbers, 5000000 is very far from 4000000 because the difference is 1000000 (million)

With "p-adic" numbers, 5000000 is very close to 4000000 because the difference is 1/1000000 (millionth)

This isn't correct, but it gives you the correct "feeling" of what p-adic numbers behave like.

Also know that it's possible to do Calculus and Complex Numbers and everything with p-adic numbers.

Ultrametric space

If you look up ultrametric space in Wikipedia, its formal definition is:

A space where every triangle is a Isosceles triangle which is taller and thinner than a Equilateral triangle with the same base. Meaning the base of every triangle is "squeezed" to be slim.

But that doesn't help very much, so a better "definition" from StackExchange question about "Visualizing Balls in Ultrametric Spaces" and especially Mirko's answer there:

Think of the Cantor set and its basic closed-and-open intervals, ... Note that for any two such intervals, they either do not intersect, or one is contained in the other.

The reason that I'm bringing talking about the "Ultrametric Space" is :

(1) The p-adic numbers form a complete ultrametric space.

(2) This fractal like structure creates "dust" that is spread evenly and yet not continuously but discretely throughout space (in the case of p-adic numbers: throughout the number line).

Another application (example) of an "ultrametric space" "Tree of Life" in biology, also called "Phylogenetic Tree".

The distance from the root to the end of every leaf is the same. (The Cantor Set middle points are also shown like a binary tree (in red color) with this property in one of the pictures in Wikipedia)

Discrete Space

OK, so now after a long (and hopefully gradual) preparation we are getting to my theory:

My first step is that I think space is not continuous but instead space is discrete.

This isn't as bizarre as it sounds, you can read in Wikipedia - Quantum Spacetime.

One set of rounded coordinates

I think that the space that we see is like the pixels on the screen metaphor.

Of course, instead of 2-D pixels Mother Nature uses 3-D voxels, and she has better hardware than a personal computer.

The "display" coordinates are the only type of coordinates that we can see. They are like the integer values of the little "squares".

The real calculations of movement (before being rounded for the display squares) are done in two other systems of coordinates which are a lot more accurate:

Two sets of accurate coordinates

Most people know about the rational numbers (something divided by something else).

But what most people are unaware of is that these numbers come in two "flavors": "normal" and p-adic.

But we know the p-adic numbers are just as good, and they also have their special property of "flipped" distance.

So I claim that "normally" all the particles are on the "normal" rational coordinates.

But when we "entangle" two particles, what we are actually doing is giving them a little "nudge" and push them onto p-adic coordinates.

To us they still look the same because we only see the rounded display coordinates, and the two accurate coordinates are doing rounding in the same way;

But in fact, the two "entangled" particles are close to each other because in p-adic world the further apart they are, the closer they get.

Distorted mirror interpretation

If the p-adic distance behavior still makes no sense think about the following model:

in every "normal" coordinate on the number line we put a normal glass window so what is near looks near; what is far looks far.

in every "p-adic" coordinate on the number line we put distorted glass window so what is near looks near; and what is far also looks near.

remember: it "shrinks" the number line horizontally so that even the opposite ends of the universe become near.

Distorted chessboard interpretation

Let's say that the light color squares are the "normal" rational coordinates. The dark color squares are the p-adic coordinates.

Once the two bishops were pushed slightly to the dark squares, the other pieces are transparent for them - the two bishops have a clear line of sight to act on each other.

What's more - the special structure of the p-adic space means that while the light color "normal" coordinates grid remains rigid and flat, the dark color p-adic coordinates are curved so that very far away ends become close together.

This is like the situation on the ball we live on - planet Earth - when you walk a long distance from where you are (far), you eventually return to the same place (close).

Visualization with wooden chessboard

This chessboard is very dear to me: It was hand-made by my father when he was a boy! On the other side it closes like a box for the pieces and also has backgammon triangles.

1. How it looks to us

2. Discrete space

3. Entangled bishops colored in black

4. Curved space

5. Entangled bishops on ball

Proper disclosure

AFTER I thought about this MYSELF I found a physicist named Tim Palmer who have a similar theory!

(At least I think it's similar, because I can't understand the "hardcore" mathematics).

A link to the non-technical article in the magazine New Scientist:

https://www.newscientist.com/article/mg20127011-600-can-fractals-make-sense-of-the-quantum-world/

A link to the full article here - thank you Stealth Skater!

http://www.stealthskater.com/Documents/Quantum_02.pdf

You can read about Tim Palmer in Wikipedia - he's very impressive!

and also about his theory: Invariant set postulate

And also this technical article by Tim Palmer that really sounds like what I'm saying (at least the headline - the rest I can't understand)

p-adic Distance, Finite Precision and Emergent Superdeterminism: A Number-Theoretic Consistent-Histories Approach to Local Quantum Realism

See also in Wikipedia:

P-adic Quantum Mechanics

https://en.wikipedia.org/wiki/P-adic_quantum_mechanics

Chapter 4 – Quantum Entanglement Communication

So I was running this idea in my head, obviously we can't travel through the 4th dimension because we contain electric charges; But can we deliver messages through it? I already explained that we do when we use all sorts of electromagnetic waves (radio, TV, phone) but can we use it to send messages not just across our planet but across our universe?

OK I can see you protesting reading this in your beds somewhere: The rule is we can't go over the speed limit – no useful information can go from place to place faster than the speed of light, only random bits. Right?

Hold your horses: First, we're not going from place to place, we're going through the shortcut of the fourth dimension, and inside there the speed limit does not apply.

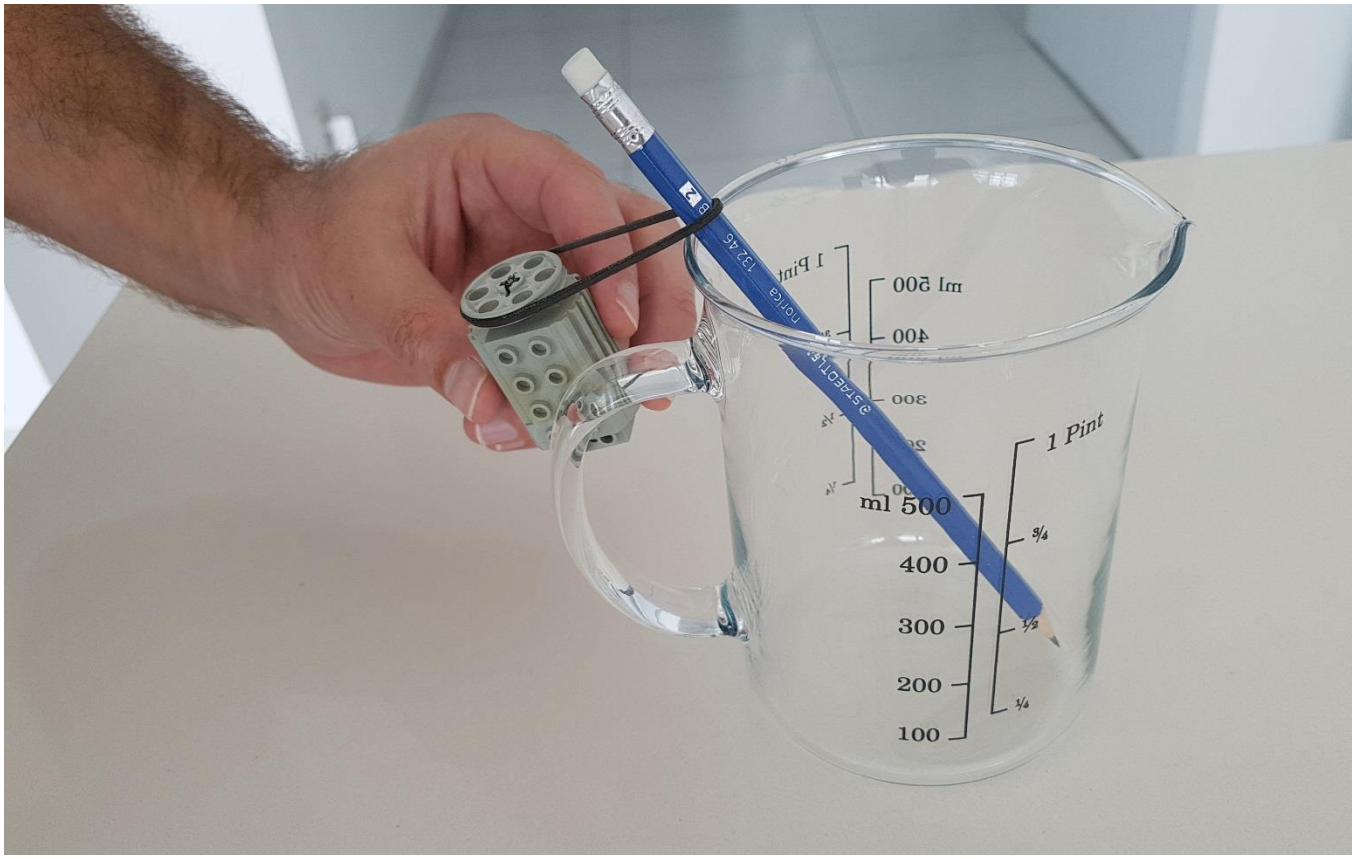
Second, we're not using the entangled particles themselves to transmit the message, we only use them as breadcrumbs to where our "Pneumatic tube" begins and ends. I'll explain as usual using a metaphor.

Think of two particles connected somehow with the same spin (until you check the spin and by this disconnect them), in an analogy of two two-dimensional (2D) planes that are connected through the third dimension (3D). This will help us understand how two three-dimensional (3D) spaces are connected through the fourth dimension.

Rotating Pencil Metaphor

We imagine glass of water with half water half oil (the oil floats above the water they don't mix), and above the water of course there is the air of the room. So we have 3 layers from top to bottom: air, oil, water. And we have two "meeting" surfaces: one between the air and the oil, near the top of the glass, and the another one between the oil and the water near the middle of the glass. Each of these two surfaces: AIR-OIL and OIL-WATER is a separate 2D plane and they don't "know" about each other, except that they are connected through the pencil that goes through the 3D plane.

Into this glass with the liquids, we insert a pencil in 45 degrees (like you would a teaspoon in a cup of tea). Now we have a small motor that rotates the pencil along the pencil's axis. The sharp point (with which you write) of the pencil stays at the same point all the time. And the eraser of the pencil remains at the same point all the time. The motor can be sitting outside the glass could be a LEGO toy motor rotating a shaft that has a rubber band that goes around the pencil and that's how it rotates it for example.



Let's say we can't see the pencil and only feel it through our tactile sense – touching it for example with our fingers and feeling which way the spin is, by pressing gently (opposing a little) with our fingers just enough to feel the direction of rotation, but let's also suppose that the toy engine is so delicate that by this very "checking" we ruin the little motor that spins.

So for example, if we felt up in the air (by touching the pencil end that protrudes out from the glass) that the pencil rotates clockwise, then deep down inside the oil there was also rotation in clockwise direction, but now they are no longer rotating (in reality it's no longer synchronized but our metaphor is simpler) because of our check.

If the glass of water and oil would become bigger let's say now it's a bucket of water and oil or a lake of oil and water, the pencil is extended automatically to stay in 45 degrees and connect the layer of AIR-OIL and the layer of OIL-WATER.

So we can take these two meeting points further apart from one another, and if we look at the glass from above the points (where the pencil crosses from one kind of material to another kind of material) are getting away from each other, in what from above looks to us as two dimensions, but if we look from the side we see the pencil stretched between them in the extra dimension.

Pipe Made of Rotating Pencils Metaphor

So we can't use the pencil directly for communication through the third dimension, but what we can do is create a pipe that is built from such pencils glued to each other in parallel. If we then shine a flashlight through this pipe, we can see the light coming through the extra dimension from one meeting point of the pipe (AIR-OIL) to the second meeting point of the pipe (OIL-WATER) and we can also signal with another flashlight in the other direction.

The equivalent for our world (which we perceive as three dimensional) is instead of a circle (2D) at the end of the pipe we make one sphere (3D) that we give to one spaceship, and this sphere is made of particles which are quantum entangled with a second sphere which we give to a second spaceship. In the middle of each sphere we put a light bulb that shines in all directions and then the sphere reaches from the first sphere to the second sphere through the fourth dimension.

Note that we don't rely on any reflectivity (like inside of a fiber-optic cable), or any other property of the pipe. We only rely on the continuity of the fourth dimension (like if you know the "Intermediate value theorem") in simple words we say: if we have point A and point C then we know that somewhere between them is point B.

But in our case to make contact with the aliens for the first time, I couldn't rely on having the two spheres together to begin with. I made one "phone receiver" sphere, and I have to rely on the aliens to be technically sophisticated enough to build the other one.

In fact, I was counting on the aliens to do something harder than just listening, I was counting on them to eavesdrop to a "conversation" in the fourth dimension. For example, in the army we ICOM receiver that we used to eavesdrop to cellular conversations with. In general, with receivers you see visual a spike on the flat line on the spectrum where there's a continues broadcast, so I was building on the fact that the aliens can do this in the fourth dimension where distance is no longer relevant.

The most distance I could achieve was the other side of the Earth. I didn't know if my broadcast would go around the Earth which is almost 20 thousand kilometers, or through the Earth which is almost 13 thousand kilometers, but in anyway this was the best I could do. So the furthest point from Israel is in Rapa Iti which is the largest and only inhabited island of the Bass Islands in French Polynesia.

Unfortunately, this wasn't relevant because the lifetime of all these entangled particles that we are able to produce is less than a second! Here you see a news article by by Lisa Zyga, from Phys.org, which tells us it's now 10 milliseconds:

https://phys.org/news/2015-09-entanglement-lifetime-magnitude-coupled-cavities.html

Then watching videos like these I arrived at the conclusion that the best that I can do is to make a stream of short-lived entangled photons, which will hopefully together "trace" a small spike in the fourth dimensional spectrum. If the aliens can calculate their average position (including the fourth-dimension coordinates) then they will be able to predict where to read or write the next bit.

https://www.youtube.com/watch?v=2Ut0F4a9dQk

This crystal can split light particles

by Physics Girl

https://www.youtube.com/watch?v=ViI0OOY9oHE

Can you make quantum entangled photons using garbage and fertilizer? Probably.

by The Thought Emporium

https://www.youtube.com/watch?v=ixCljzqHkHI

How to Produce Entanglement

by Ben from whentheappledrops Youtube channel

So what we ask from the aliens is a lot harder, in the telephone metaphor it's like I'm not using a frequency hopper and I'm sending a bit here a bit there, and asking the aliens to follow me, but without them knowing in advance where I'm going to hop next. What I can do is repeat my message over and over again, and by this redundancy I will make it easier for the aliens to pick up the entire message.

This light (which goes in much faster than light) based communication technology only works in one direction at a time (simplex) but it allows us to use the fourth dimension without understanding deeply how it's built, and the light will reach immediately even if we are at two separate ends of the universe.

These resources indicated that for the entanglement laser-non-linear-crystal combination to be reliable, it can't be done at home, you need the level of technological sophistication of industry or academia engineers.

https://blogs.scientificamerican.com/critical-opalescence/how-to-build-your-own-quantum-entanglement-experiment-part-1-of-2/

https://blogs.scientificamerican.com/critical-opalescence/how-to-build-your-own-quantum-entanglement-experiment-part-2-of-2/

https://physics.stackexchange.com/questions/172159/what-laser-and-bbo-are-needed-to-create-entangled-laser-streams

The closest laser and nonlinear crystal to my home in Haifa is in the Technion which is like Israel's little version of MIT in the electrical engineering building and there in the nano photonics facility.

How did I gain access to this equipment in the many nights that I needed?

In one of my favorite movies Snatch (2000) by Guy Ritchie, there's a line spoken by "Doug the head": This ain't exactly Vegas, and this ain't exactly legal.

So let's just say that I certainly didn't go to the dean of the electrical engineering faculty and explain I needed to talk to aliens. It made much more sense to befriend one of the graduate students that made a project there, who earned minimal wage, and has legitimate access to the lab at night, and convince him that I'm a super nerd which is true, who wants to experiment with the laser at night which is also true, and would pay him for each hour three times as much as the Technion pays – so it's WIN-WIN.

Chapter 5 – Turing Machine

Realizing that I'm now the only one on Earth who can contact aliens was suddenly a huge responsibility. I wanted to tell someone about it, but I was afraid: What if people would use this the wrong way, and ruin our only chance for contacting the civilized community of the cosmos? No. People are stupid (short sighted and never understanding their own long-term interest) and bad (selfish and not able to understand sharing and win-win). I can't let people ruin this.

Then I thought of humanity's situation. My PC runs SETI (search for extraterrestrial intelligence) radio-telescope-recordings-analyzing-for-patterns software, and I've read of METI (Messaging Extraterrestrial Intelligence) and their electronic-music-mathematics-tutorial message, so I was aware of what astrophysicists are trying to transmit and receive. But here it was totally different because I was able to both transmit and receive immediately.

I remembered that people like Stephen Hawking how I agree with in most aspects (but not this one) said that we shouldn't contact aliens because they might be unfriendly. In my opinion this stand shows typical human arrogance. We are a baby civilization. If anyone else of the adults in the cosmos would want to kill us, they would already done so easily, we're not that hard to spot with all our whining and thermonuclear bombs that we detonated here. So it would be like a baby deciding it's too dangerous to attract any attention and just lie there silently. Mom will not be able to help him grow, and he'll just die in loneliness soon after.

In general, if a civilization is sophisticated enough to get here over the vast distances of outer space, then we should be very humble and friendly because they are much more advanced than us technologically and can destroy us at will – we are defenseless against such creatures. On the other hand, the thought that they would come all this way to harm us is also idiotic. Such advanced civilization has as much to gain from us as sea faring sailors have to gain from ants of a small ant hill that they found on the bitch of some island they visit. Yes – Darwin's ship "abducted" one ant, but smart people like Darwin are the ones fighting to protect the natural habitats where the ants live! In short, we are at their mercy and it's our best interest to play nice and to know our place.

OK so we need to converse with the aliens but how? First of all if the message is not one way (if you expect to hear from a civilization centuries after it's gone that counts in my book as one way), it makes sense that the first message will not be just a statement like "I'm here" but more like a question awaiting an answer. Since the aliens are a lot smarter than me, it follows that I should speak first (like the baby going DA DA) and the aliens will understand what I'm trying to say (like the mother answering "Yes! That's Daddy" happy that the baby talks and annoyed he said daddy before mommy) . So what would I start a conversation

about? I don't even know the language? What's the most common language that they would understand? Mathematics. But just sending numbers back and forth won't get us anywhere. No, there must be something more useful that I can pass in that binary ON-OFF system that I built.

Then it hit me: We should switch back and forth tiny computer programs, that will get bigger and bigger! So of course, the aliens don't have my kind of PC, but surely they have some kind of computer so they are aware of the most universal and simple design – Turing Machine. If you don't know what it is you can look at this nice video here[3]: Turing Machines Explained - Computerphile.

So what would be my "Hello, Universe!" program? It needs to be very simple and very universal. What better candidate is there than the first program that was ever made on our planet, by the genius Augusta Ada King, Countess of Lovelace? If you remember the first computer in the history of our planet was never build but was planned very meticulously by the English polymath Charles Babbage, and when translating the documentation for it, Ada Lovelace added in her handwriting on the last part of the paper (which is 3 times longer than the original paper) an algorithm for computing "Bernoulli numbers".

Physical copies of the book can be found here:

https://www.scss.tcd.ie/misc/kronos/A_Lovelace_offprints_IEEE_plus_postscript.pdf

You can read it here, in John Walker's website (founder of Autodesk!):

http://www.fourmilab.ch/babbage/sketch.html

You can read the whole thing here in Richard Taylor book from 1843

Scientific Memoirs, Selected from the Transactions of Foreign Academies of Science and Learned Societies, and from Foreign Journals, Volume 3

which is completely scanned in Google Books:

https://books.google.co.il/books?id=qsY-AAAAYAAJ

The Analytical Engine starts at page 666, and Ada Lovelace's notes start at page 691.

[3] https://www.youtube.com/watch?v=dNRDvLACg5Q

and here too in WikiSource:

https://en.wikisource.org/wiki/Scientific_Memoirs/3/Sketch_of_the_Analytical_Engine_invented_by_Charles_Babbage,_Esq.

https://en.wikisource.org/wiki/Scientific_Memoirs/3/Sketch_of_the_Analytical_Engine_invented_by_Charles_Babbage,_Esq./Notes_by_the_Translator

And the history of it including some mathematical explanation by Stephen Wolfram in Wired magazine here:

Untangling the Tale of Ada Lovelace

https://www.wired.com/2015/12/untangling-the-tale-of-ada-lovelace/

You can listen to it here:

https://soundcloud.com/stephenwolfram/sets/untangling-the-tale-of-ada

Bernoulli numbers by Jose Navarro on Youtube (requires calculus):

https://www.youtube.com/watch?v=yGpkB2OoQjk

So the next step was to convert this from an "Analytical Engine" program to a "Turing Machine" program. A Turing machine is the most general computer, made of two series of binary numbers (ones and zeroes) one is the data and the other is the instructions (the machine) of what to do with the data.

More useful to my purpose I found an article that by Two Bit History that explains how to do this program in C language:

https://twobithistory.org/2018/08/18/ada-lovelace-note-g.html

The source code can be found here:

https://gist.github.com/sinclairtarget/ad18ac65d277e453da5f479d6ccfc20e

And it also refers to another version by Jim Randall written in Python:

https://enigmaticcode.wordpress.com/tag/bernoulli-numbers/

very cool!

So all I had to do was to take these and translate them to a string of ones and zeroes, set up the fourth dimensional "pipe" entry on my side, and flash a small light bulb in the middle of it, repeating the first sequence and the second sequence and then pause for a minute and then repeat. Over and over again.

What happened after a while was amazing: the light bulb started flashing during the pause minute! This was exactly what I was hoping for! I pre-programmed the computer to record whatever the light bulb does during the pause, and if it starts flashing then to stop "talking" and start "listening". What I got from the aliens was another program, which I guess was the equivalent of me writing to a big newspaper like "The Atlantic" and being asked to install in my computer a more secure method of communication, like Tor browser and go to this and that "onion" address and send my messages through that.

So of course, I ran the alien program and they started dictating to my computer a very long program which my only guess was that it was the next level: an AI program that will allow me to communicate with the aliens in natural language for me, by studying my world. This was again a point of a huge leap of faith – do I trust the alien AI? Am I opening a "monstrously carven portal" and releasing Cthulhu?

Again, it's very easy to see that the chances to this are absolutely nil. Let's suppose a hostile alien civilization does exist out there, you can rule out all possible motivations by showing how ineffective it would be for the alien civilization to await millions of years for the life forms on Earth to maybe and maybe not develop this communication channel. It's like if someone want to be a pirate and he would go to a place where ships pass once every million years. Not a very smart strategy for such an advanced race.

On top of this if the aliens themselves aren't coming here physically, then all the usual - taking our women, food, bodies, minerals, workforce, - reasons of coming here are going out the window. Of course, they went out the window a lot earlier if you know biology (aliens find our females as sexy as they find the aliens – imagine screaming women from b-movies) let alone even different species here on Earth can't produce an offspring together (like man and chimpanzee) let alone man and alien. About the food and resources, it's much cheaper to mine them closer to the aliens' home, the same goes for finding a habitable planet. Such advanced aliens can build their own robots and don't need humans to server or worship them. Even in the astronomically low chances of an alien crash landing on Earth he would want to get out of here as soon as possible because compared to such a creature we are like apes at best, and he'll want to escape from this zoo ASAP.

And so with a racing heart and not knowing what to expect from this first contact, I pressed "ENTER".

Since I was using the TuringMachine function of Wolfram Mathematica I had some indication of how "crazy" the program is getting by the visual representation of the plot, and after that last ENTER the graph became very hectic indeed self-referencing more and more, if anything they reminded me of fractals.

For a while there was a short "war" between the Norton security software and the alien program which I guess was teaching itself to program and hack other programs, because the screen was practically filled with Norton's protests but then they all disappeared as the alien program figured out how to close the antivirus and the firewall.

Now that the alien program was free it seems it opened a few browser windows and it was reading Wikipedia, and I don't mean reading in Wikipedia, I mean reading the whole thing. It just browsed at blazing speed through every subject imaginable. the fourth-dimension bulb flashed so much it looked like it's almost constantly on.

Then out of the blue the annoying personal assistant "Cortana" thing of Windows suddenly spoke: "Greetings! We are 4144209.". I was so shocked it took me a few seconds to understand I'm actually talking to alien beings. "Greetings! My name is Nir Strulovitz, I am human" I heard myself saying.

I imagine you think I represent humanity very poorly, not even showing interest by asking something, but you have to understand that nothing prepared me for this. I grew up on films like Space Odyssey 2001, ET the Extraterrestrial and Close Encounters of the Third Kind, but you see in all these movies, it's not like you really have conversations with the aliens.

It was only later that I learned that our universe doesn't have a center, or more precisely it has a center but it's no longer inside it (think of a doughnut shaped balloon - the center is not in the doughnut, it's in the hole), so the first advanced civilizations who set up the supreme council, decided to enumerate each civilization systematically, because most civilizations don't use sound to communicate, and even those that do usually can't pronounce each other's names.

The enumeration scheme is based on toroidal coordinates in 3D space, and the "reference circle" started (their equivalent to Greenwich Meridian (0° longitude) is what I called the Orrery's pedestal, and what they called point of zero movement, which as you can already guess (and as I will explain in detail in a later chapter), is the point of origin of the big bang.

Turns out the agreed upon universal "metric system" between more advanced civilizations is not decimal but binary. So from there, if you look from the POV of the big bang itself (which is again outside the universe by now) the supreme council divided the universal torus into

about 16 million sectors (2 to the power of 24) because that's the minimal power of two that is able to contain the 10 million super-clusters out there. They are roughly evenly scattered.

You can think of it as taking a doughnut and slicing it into 360 slices, only here it's 16 million slices.

So the beginning of their designation that they told me, was their slice of the doughnut which turned out to be 4144209.

From there I'm not going into the math of the coordinates which you can see here:

https://en.wikipedia.org/wiki/Toroidal_coordinates

But the "resolution" is 2 to the power of 34 (about 17 billion) which allow them to have billions of galaxies in each structure.

In each galaxy we have up to 100 trillion (100 followed by 12 zeros) which is contained in 2 to the power of 47 (about 140 trillion).

so to know where your star (sun) is in the universe, the supreme council gives you a number with:

24 + 34 + 47 = 105 digits!

They were telling me their Z coordinate, which was 4144209 and it turns out that that's the polite way to introduce your civilization to another, and in the process also to indicate roughly which supercluster you're from. Another curiosity I picked up later is that most aliens are much smarter than humans and a number like 4144209 is as natural for them as small numbers are for us. Just like there are rival gangs in Los Angeles calling themselves 13 and 18, there are alien civilizations calling themselves by their Z coordinate.

"Are you from the same galaxy as me?" I asked.

I think it was this question that brought home my ignorance and by extension that of humanity. I was never one for pretense, not with humans where I usually consider myself

smarter than my conversation companion, and not with aliens who are most definitely a lot smarter than me. I later found out that they valued this quality.

"No, we are from Perseus-Pisces Supercluster, we are 250 million light-years away from you".

I was so disappointed. If they were on the other side of the Milky Way, we would be separated by 50 thousand light-years. With current human technology it would take me 20 thousand years to travel a distance of one light year; So a journey to the other end of the Milky way would take 50,000 x 20,000 = 1,000,000,000 (one billion) years to make; That's not practical for humans but I was hoping that my new friends would come and visit me. But in the current situation where we're separated by 250 million light-years, visiting my new friends would require me to fly in our best spaceship for 5,000,000,000,000 (five trillion) years. I was positive that such a long-distance relationship is impractical even with their technology.

"My civilization doesn't have the technology to come visit you, can you please come to visit us?" I asked.

The response was without a shadow of a doubt the most incredible sentence that any human has ever heard:

"There is no time. We beg you to save us."

Artificial intelligence my ass, I thought. It must have mistranslated what they obviously meant – We need you to visit us. I'll try to rephrase what I already said.

"I cannot reach you physically, you're too far for me. We humans didn't even reach the closest star system yet."

"We know. We will meet in cyberspace. Please help us. Our very existence is in your hands."

Okay… I guess this is the first intergalactic joke then, an out of this world sense of humor. I will just make sure, as not to offend my new friends.

"Is this a joke?" I asked.

There was a small pause. I feared I have just insulted them. Maybe it's customary in their culture, or maybe it's just a figure of speech to show somebody respect, like in Egyptian movies when they say: You light up the house with your presence (in Arabic: "menawwar") and they don't mean literally illuminating? Maybe the polite response is to answer that they save me too?

Later on, I found out that they evolved with telepathic ability so they don't have the concepts of jokes and lies.

"This is not a joke. We are extremely serious. Our oracle has predicted this would happen. Without you all is lost. We will be doomed. "

I assumed the oracle is a cleric of some kind but it was later revealed to me that they have a very powerful "Expert system" that was designed to go through the knowledge of their entire civilization and find a solution to a given problem. Their society is centered around its advice. But this time since it found no possible solution in its data banks and algorithms it surmised that the solution must come from outside the system by external data or external algorithm. The best chance would then come from contact with an alien entity who have totally different data and algorithms, and then my contact was interpreted as this solution of highest probability coming true. Of course, I wasn't aware of all this at the time.

Great, I thought, I managed to contact alien life and I stumbled onto crazy religious aliens who consider me their messiah. Me. Their savior. It reminded me of Montezuma who mistook Cortés for the Aztec god Quetzalcoatl.

"We humans are just a primitive species compared to you. You are more intelligent. You have better technology. How can humans help you? It's like a mother asking help from her baby" I said.

Their answer demonstrated that in the few seconds of our conversation they probably read everything there is to know about me online.

"We saw you wrote a book about learning from the intuitions of babies to develop new insights in physics."

Touché! I thought to myself. They did their homework. I was about to reply but they went on:

"From what we read about you, you were never appreciated by other humans. Even though you try to help them and be good to them, they always see you as different from them. They see you as an alien."

The whole atmosphere of the conversation changed for me, as I saw their meaning. I seem crazy to other humans with my out of the box ideas. Every time I try to be good to humans, I faced suspicion and ridicule, always outcasted and scorned. Am I not doing the same now to these aliens, just because their ideas are different from what I've grown to expect?

They seemed to guess correctly the reasons for my reluctance:

"Do you think we would contact you halfway across the cosmos just to waste your time with invented scenarios? You credit us with so much wisdom. Please also trust our judgement that we wouldn't waste your time and ours on imaginary hopes.

Before I had a chance to say something, they went on:

"We are also a proud people. We would not be pleading for your help if we could do this ourselves. We agree with you that humans in general can't help us. But you are not an ordinary human and you never were. All your life you suffered from your uniqueness. Please let your special gifts light the way to our salvation. We promise that we will be grateful beyond words and here your talents will be appreciated for as long as our civilization exists. It is your destiny".

What could I say? I caved in to their earnest plea:

"Alright if you think I can help, then ok I will try to help."

The electronic voice replied:

"Good! Good! Thank you so very much! We are most grateful!"

"Okay. So tell me what to do" I said.

"We sent you a helper – it's the AI program that operates now on your computer and scanned your computer networks so that it can translate for us and help you with your mission. "

"Thank you! But what is my mission?" I asked.

"We will tell you very soon." They answered.

"How may I call you? We humans give short names to everything." I said.

"In our civilization we don't have names, we refer to each other by mental pictures. But you can give us names of your choosing, if it makes you comfortable."

I thought about where they're from: Perseus-Pisces Supercluster. Perseus was the hero that beheaded the monster Medusa and used her head to kill another monster Cetus and rescue the princess Andromeda.

"If it's okay with you, since I'm supposed to fight this evil that threatens you, I'm like Perseus in Earth's Greek mythology, and you help and guide me so I will call you "Athena". And the software you gave me protects me while I do this, so I will call it "Shield".

"That's ok with us", answered Athena.

"I just wish I had my Andromeda with me." I said to myself.

"Who is she?" Asked Athena.

"She is my Ex-girlfriend Myra. But she has a new boyfriend now." I said sadly.

"She will be with you." Asked Athena.

"But she mustn't be harmed, she's very dear to me." I said.

"Understood. Anything else?" said Athena.

"No. that's it. What should I do now?" said I.

"The shield arranged a small crew to help you, they will do whatever you say, and you also will have full cooperation from the Technion."

It turned out that Shield has by now hacked into all the computer networks on Earth including encrypted ones such as the " Shin Bet" which is like Israel's FBI. Since such organizations are used to working in a very departmentalized way, all the Shield needed to get a crew of secret agents to do its bidding was a direct order from the head of the organization. Since it hacked also into the phone landlines and cellular networks, the Shield was in an easy position to imitate his voice from public interviews and recruit a top-secret team for us no questions asked.

It was still night. The crew now got specific orders to arrest Myra and her boyfriend at gunpoint and bring them bound and gagged to a "Shin Bet" safe house nearby. They were under strict orders not to talk with them, they just placed them in separate rooms and roughed up her boyfriend a bit, to get Myra into a more cooperative mood. Then she was blindfolded and brought to me.

I don't know who came up with Stockholm Syndrome, but it certainly didn't work with Myra. As soon as I took off her blindfold and she saw I was behind this she was furious.

"Mimi I know how you feel about all this, but I had no choice. I need your help."

I removed her gag, so now she could speak. She tried hard to escape her restraints but she was cable tied tightly to an office chair. Then she spat in my face.

"You sick fuck! You kidnapped me! I'm in a new relationship! Let me go!" Then she started crying.

" Mimi, this will sound very strange to you, but I was recently contacted by aliens from outer space. They need my help. And I need yours. This is much bigger than the two of us. Please try to understand."

" I understand. I understand that you have gone off the rails, and hired a few other psychos in the Dark Net to kidnap me. Did the flying saucer ordered you to abduct me for examination? Let me guess – You ordered you to impregnate me with alien sperm?"

I saw that as usual with Myra the truth never helps, so I got another idea.

"Athena, could you please convince her that I'm telling the truth?" I asked Athena for help.

"Your credit card PIN number is 7109. The code to your car is 4737. The code to the safe in your clinic is 5669. Your password is usually based on "Color of Magic" with American spelling. Your last blood test showed a little deficiency in B and D vitamins. The last porn you watched in "private" mode was lezdom strap-on starring Francesca Le. You lately tried anal for the first time with your current boyfriend but he told his friends you quit in the middle…"

"Okay Okay! That's enough! Please shut up! " she shouted. Myra cheeks were flushed now and she took a few seconds to digest the situation and the plausibility of the alien contact.

"Do you believe me now?" I asked.

"If they know everything, why on Earth would they need you?" she asked.

"Remember when we wanted to make out in the car and I suggested we would take away two cups of hot cocoa with us from that store in Carmel Center, and you later said about it that I have good ideas?"

"What's you point?"

"They think I have good ideas".

"You're shitting me, right?"

"No, really, I'm the first person in our world to use quantum entangled particles to make first contact with an alien civilization. You know I never lie."

"With you it's the other way around. You reveal everything." She said.

"Remember when you told me no one will ever listen to my broadcasts? Well somebody did, and it's an advanced alien civilization. And they need me. They need us. Will you help?"

I took out my MacGyver Knife which she always hated, and unfolded the main blade. She looked at me frightened. I cut the cable ties that restrained her arms and legs.

"It's your choice now. You're free to go back to your shitty boyfriend and get on with your everyday lives. I'm sure you will save a few lives in the clinic today." Myra is a veterinarian doctor, you see. "Or you can come with me and be part of the greatest thing that humanity has ever did, save an entire civilization and be admired forever." I laid down her options before her.

"You're serious, aren't you?" she asked.

I nodded in confirmation.

"And you want ME by your side, after all that's happened?" she asked.

"I can't make it without you." I replied.

She wiped her tears with the back of her hand and smiled.

"So what are we waiting for? Come on! Come on!" she said smiling.

I smiled. It was good to see my Myra again.

"Athena we're ready. What do we do now?" I asked.

"Now we're going to see each other. We need you two to go to the Center for Graphics and Geometric Computing." Athena said.

"Where's that?" Myra asked.

"As you exit the room turn left. Walk to the end of the corridor and take the stairs to the ground floor." Shield said, but this time out of the "Google Assistant" of both of our phones Myra's and mine. We smiled at each other and hit the road, followed by our entourage of men in black.

Chapter 6 – Handshake Through Haptic Gloves

In the graphics center I was surprised to find besides the Oculus Rift S virtual reality (VR) headset for the visual side, also the haptX haptic gloves which also let you feel textures and other delicate tactile experiences besides force feedback. What's more they also had a version of the full body exoskeleton that lets you get force feedback on your whole limbs like the whole arm or leg.

The coolest thing was an experimental prototype structure that allowed you to experience zero gravity by being inside a bigger than a human gyroscope, think of the awesome movie The Lawnmower Man from 1992, but instead of just spinning wildly in all directions, the rotating "centrifuge" uses the centrifugal force to counteract the gravity of the Earth, so the person feels weightless. The person is tilted in 45 degrees in respect to the ground and rotated from his or her base (feet), but of course the rest of the body is supported by the exoskeleton.

Maybe a simpler way to describe how it works is if you imagine having a funnel and you're pouring water through it (the normal situation the water feel gravity and slide down along the slopes of the funnel wall); On the other hand if you rotate the funnel so that the water run along the walls of the funnel like a motorcycle rider on the "Wall of death". If the rotation is fast enough it can even be stronger then the gravity, and the water will slide upwards on the slope of the funnel walls. If it's set just right, the water will stay in the same height where the up and down force cancel each other.

Anyway, the lab had two sets like these, which Myra and me strapped into, and the Shield took over the powerful computer that was coordinating the whole visual-audio-haptic experience, so we didn't have to worry about breaking a leg (only in the metaphor sense of good luck). It was somewhat ironic that I was always thinking that if I had access to this kind of technology, I would simulate having sex with Myra. Now she was a few meters from me in the flesh, but we were on a mission that's much too important to allow such nonsense, and besides It takes two to tango.

Before connecting the Virtual Reality system to the fourth dimensional communication channel which will together be a portal to meet the aliens and try and help them, I asked the secret service guys to take my credit card and order us some pizzas and Coke, and also to themselves and also to Myra's asshole boyfriend. With all the hacking the Shield did, we might as well eat like hackers too.

Finally, the big moment has arrived, I asked Myra if she's ready, and after getting an excited approval from Myra, I asked the Shield to connect us to Athena.

We were now inside Athena's spaceship!

Before I describe what the Athenians look like, allow to try to explain why the look like that, by explaining how they came to be.

How does life evolve? We all know the common theory here on Earth, where there's a soup of chemicals, and gradually a self-replicating machine comes into existence. From there the self-replicating machine does just that, and if there is a mutation that allow it to make more copies, or allow them to survive better, this mutation gets more widespread and passes on this trait.

All this is similar to a normal program which has a beginning and an end, turning into a recursive program which calls a part of itself again and again, each time creating a new copy. We assume that that replicating part has the ability to call itself, otherwise it's just a loop. A loop is similar to Geppetto making many copies of Pinocchio. A recursion is if Pinocchio himself had the ability to chop wood and create another Pinocchio that will make another Pinocchio and so on.

So our model of what happened on earth is simple recursion. The same "machine" makes another "machine" that makes another "machine" and so on, and they are all alike. But what if instead there are two machines that create each other? This is called mutual recursion

https://en.wikipedia.org/wiki/Mutual_recursion

There is a nice example in Wikipedia where there is a little "machine" called IsEven that "eats" a number, and decides whether that number is even. If it is, it writes EVEN to the screen and stops. If it isn't, the machine "spits" out a one-unit smaller number.

There's another little "machine" which is called IsOdd that "eats" a number, and decides whether that number is odd. If it is, it writes ODD to the screen and stops. If it isn't, the machine "spits" out a one-unit smaller number.

These two little machines throw the number between each other until there's nothing left of it, so they work together to do their common job. If you want a real-life example it would be Geppetto creating a wooden mallet and a wooden chisel and they would both "work" on each other and on the input material (raw wood) to make more mallets and chisels.

Or another real-world example is sexual reproduction. For example, if I would have children with Myra, let's say Myra would give birth to a daughter. The daughter is a replication of

Myra – she's a female like Myra. But it's still beneficial for my genes: (1) because men and women are very similar, and (2) because in the next generation the daughter can give birth to a son, and then he is in a little part a replication of me because he's male.

You might be wondering: why use mutual recursion instead of direct recursion (which is mathematically equivalent)? The reason that this kind of replicating had more chance of evolving is that it makes it simpler (by not repeating code) and better (by specialization). In our hammer and chisel example, if we had to build one tool which is both of them, you might end up with an ice axe which is not as optimized for that job as the two separate tools.

So, we bring ourselves to the conclusion that mutual recursion is also beneficial to both types of creatures (mallet and chisel, or, man and women). In our human case, the creatures look almost the same, of course women have different sex organ, but basically all humans have hands, legs, heads, etc. What if in another evolution, the basic reproducing unit were two machines that are very different from each other?

That's what happened with the Athenians: they developed as simple electronic circuits made of germanium and silicone. These two materials are the equivalent to the two machines. The Athenians evolved on asteroids that were rotating around their star, just like we evolved on a piece of rock that rotates around our Sun. But their asteroids were much smaller, they didn't have an atmosphere, and they rotated around their own axis faster with shorter day-night cycle.

So when the silicone and germanium were on the side of the "Sun" they melted to liquid they could flow and depending on the rocky surface that was like a random casting mold, and once the asteroid turned so the materials were in the dark side, they "froze" solid, and being a thin sheet plate could get detached from the asteroid's surface and so with time, get stuck in a small pile two on top of each other. Since both materials are used by humans to make semiconductors, it shouldn't surprise us that blind chance also created circuits with semiconductors.

By now you've been asking yourself, electronic circuits are nice, but what good are they without electricity? But here enters another phenomenon on the surface of these asteroids, the small-scale geysers of nitrogen, that would turn to liquid on the cold side, flow underground, then boil in the hot side and create a jet of nitrogen again and again. If the nitrogen is ionized and if something is shooting fast it's easily ionized, then we have a current of electrically charged particles, which generates an inductance current in a passive circuit without touching! By passive circuit I mean a circuit that doesn't has a battery in it – like the card that opens the gate for your car when you enter your workplace parking.

What would this circuit do? It has to be simple in order to be made by pure chance, and it has to has some benefit in order to perpetuate itself. At first it probably evolved directly around the opening of each geyser, controlling for example how narrow the hole would be, or how much heat shade (germanium is transparent to infra-red) to give the ground around the geyser, or some other such parameter to optimize the current of the charged particles.

Then it might "mutate" to have primitive capacitors, or a loop that will function like a timer, these kinds of things can help it regulate electricity when it was not available regularly. As you might have guessed the Athenians are no longer dependent on being close to the geysers, their body developed a natural silicon germanium thermoelectric device, like we humans used aboard Voyager 1 and 2 spacecraft, Cassini, Galileo, and Ulysses probes.

These steps are hard to reverse engineer in detail, but the result is that having different melting points the silicone machine was able to be the mold for the germanium machine and vice versa, and create together the needed circuits for eventually evolving intelligence.

How did the circuits replicate? By drifting on top of each other, and then one-layer shades the one beneath it, so the outer (upper) layer gets more liquid and malleable while the inner one beneath it (which is already made and it acts as the mold) doesn't melt and just conduct electricity. The electric wires create a field around them that passes also through the upper layer and shape the current there until it solidifies like that. Another possibility is that the outer layer passes the "Sun"'s rays and it is the inner layer that melts more and some of it evaporates and sticks to the upper layer which is very close, so they are copied. In any case after the initial routing is made and inducted current can run barely run through the newly made "offspring" circuit can run minimal circuit through it, there is a thickening of each "wire" through a process like galvanization.

The random motion every now and then on the asteroid (the circuits can't move by themselves) happens either by similar charges (copied up and down circuits) rejecting each other and the upper one, when it's solid, float over the lower and falls to the side; Or it might be that the asteroids themselves sometimes collide with debris or among themselves and shake things around. It's also possible that the geyser itself shoots it from its place.

Unlike evolution on our planet which had movement before thinking, the Athenians had thinking before movement, and their core is basically this brain made of silicone and germanium, and the rest of their body is an adaptation of the same kind of material, grown as crystals from that central core.

Remember creatures like starfish on Earth, that if you cut down one of their arms it can grow to a whole starfish, and also the original starfish grows it back over time? Well something very similar to that, only made of metallic looking silicone and germanium

layered together and growing in 3-D space instead of just 2-D plane, so they're like a metallic looking silvery shiny "Koosh ball", only bigger: a "Koosh ball" is like a tennis ball, while Athenians are each the size of a basketball.

https://en.wikipedia.org/wiki/Koosh_ball

Koosh Ball by Evan Amos from Wikipedia.

What about the Athenians spaceship? We will get to the overall design and function of the ship in a later chapter, but for now we were on the "bridge" command center of the ship. Because the Athenians evolved in outer space, they don't need atmosphere, in fact oxygen would have corroded their silicone-germanium bodies, and taking into account that germanium is poisonous or at the very least irritant to humans, it's safe to assume that if the meeting was taking place for real and not through VR, either the Athenians or the humans would have to wear protective hazmat suits.

As it happened, we did use Virtual Reality, so both Myra and me were represented in the Athenians' ship by holograms projected by "relatives" of Shield. This was true when the Athenians looked at us. When Myra and me looked at each other we saw each other with the same technology that we saw the Athenians – VR "avatars".

I know it will sound very silly to you, but in spite of just being the first man to witness alien life and answering the big "are we alone?" question etc, the only thing on my mind was how beautiful Myra looked. Even slightly pixelated in VR, the headset was tracking her eyes (to compute only the necessary area where she looked) and so was rendering her wide beautiful green eyes shining with the rush of her excitement from meeting our alien friends.

You see, at the age of 7 or so Myra was weighing her options whether to be a zoologist, or a veterinarian. She eventually became a veterinarian, but now she fulfilled her other dream too, in the coolest way possible – an exobiology zoologist or an "exo-zoologist", so she was having the time of her life. If it was up to her, she would start examining our new friends, which of course was out of the question. Then suddenly she looked at me and I saw the hostility and suspicion turn into admiration and appreciation, because she realized my part in all this. It reminded me of the first time I mopped the floor at her apartment where we lived together. She enjoyed it more than sex. It was the same here but on a whole different league. She asked tons of questions, she was delighted and for me she was a delight herself.

So I started telling you about the command center. The Athenians don't use brain computer interface, because they are a telepathic race and this would cause huge problems, like voice commands when several people trying to give commands all at once. So their equivalent to a keyboard or a touchscreen are curved hemi-spherical "niches" like an egg cup is the niche that contains the soft boiled egg in breakfast.

https://en.wikipedia.org/wiki/Egg_cup

So inside each such "niche" they have lots of softly lit green-blue interfaces, which I guess act more or less like the USB port in our computer, but they interface with them directly, the Athenians semi conducting body material sending and receiving signals to the adapted ports.

The overall impression reminded me of a trip I made with my parents to Waitomo Glowworm Caves.

https://en.wikipedia.org/wiki/Waitomo_Glowworm_Caves

You can watch videos here:

Waitomo's Lights - Avatar in Real Life - 4k

https://www.youtube.com/watch?v=AlLKjKgV5So

by the couple Jordan and Jenna from Stoked for Saturday

and here by National Geographic 360:

https://www.youtube.com/watch?v=QjqGlLVIAtg

Anyway, if you can't watch the videos from some reason, this place is amazing, there are underwater caves in New Zealand with glowworms (like a fire flies) illuminate the tips of the stalactites that hang from the ceiling of the cave. You the visitor drift silently in a boat without motor under them, and as your position shift slowly there's an incredible 3-D effect, which only if you're a "3-D freak" like me you can fully appreciate.

So since the Athenians don't need gravity, there are niches with lots of glowing ports on the ceiling on the walls and all the floors because they don't have much use for the distinction between floor ceiling and walls. So we were surrounded by spikey "eggs" doing their work in their workstation and forgive the pun but it's an out of this world view!

So after Myra finished asking them a gazillion questions:

- Why do they have spikes?
- The spikes are used as hands, legs, antenna for the telepathic communication, wired interface to their machines, and it's also their sensory way to sense things like a shark feels electric fields.

- Do they have names?
- They don't consider themselves separate entities, they feel they're only meaningful as part of the community (So I guess calling the Athena is more proper than Athenians). They recognize each other by the arrangement of the spikes (which to Myra and me looked identical) and communicate who they mean with mental picture of his appearance.

- How do they have sex?
- They don't have males and females, and they don't have sexual reproduction; Nowadays young ones are being produced by machines by copying the circuits of the parent (like artificial insemination I guess). When they do touch each other by chance, being both electrically charged and conducting there might be sparks. I remember Myra once told me that I'm the best in the world at cuddling (like

spooning when she's the little spoon), it was the greatest feeling in the world an I felt sorry for them for not being able to experience something similar.

- Can they survive in outer space?
- Yes, they face the danger of drifting away, so they prefer to populate low gravity moons where they can form larger groups and roll from place to place (like a tumbleweed in western (American old west) films).

- What other species did they contact?
- It turns out that the Universe is a very lively place, and they have large data banks of VR simulations that we can experience if we wish. Both of us appreciated this offer very much.

- Are they immortal?
- No. Their circuit structure after forming is fixed and solid, so with time and radiation it deteriorates much like people getting older. When it's their time they are melted and their material is recycled to produce young Athenians which is considered a noble death and the civilized thing to do. Their natural life span if they don't encounter an accident of some other misfortune is a few thousand years.

- How did they build all this technology without eyes and without hands?
- They don't see the way we do, but they feel by touching and form a picture in their mind of the object, like the cat's whiskers. Human civilization first built machines then miniaturized them, but the Athena first made nano technology and then ordered the tiny machines to create small machines, that created medium machines, and so on. It's like humans developed along mechanical engineering and finally people built a mechanical computer and developed logic. The Athena started with logic and electrical engineering, and from there amplified and gained more and more physical power.

- Do they have music?
- They have something similar. it's generated like what we called "chip tune" because in space you don't have air so you don't have sound waves. They synthesize it electronically and transmit it to one another, and the good music pieces "survive" like memes. They let us hear a little, at first it sounded like white noise because it's so much faster than humans can process. But when they slowed it down for us, it sounded really ethereal, like a few theremins playing together, one lead, one bass, etc. It turns out that in their worlds, music is a direct expression of mathematics, like we use programs like Wolfram Mathematica (If you don't know it – visit Wolfram Demonstrations website) to visualize mathematics in a stunning way, the use music for the same thing. So all the harmonies are "built in". It's like one wave form would follow the scan of the X direction of some interesting 3-D surface, and another will follow the Y, the "drums" (even deeper base) will follow interesting singularities in the graph and so on. Now imagine what happens if we use the Mathematica language "manipulate" command, that adds interactive control, and you can change

the whole surface gradually with your mouse – that's what Athena's music sounds like!

- Do they play games?
- Well not our sort of few variables with lots of combinations, because for them it would be like tic-tac-toe. But they do enjoy historical and military simulations, like the French series Points de Repères (in English the series is called Butterfly Effect - note: NOT the film with the same name).

  https://fr.wikipedia.org/wiki/Points_de_rep%C3%A8res

  https://pointsdereperes.fr/

Athena answered everything very kindly, but we were not here for anthropological research. So because they knew humans are very visual they prepared a hologram presentation for us to help us understand their request for help.

The problem: rogue AI

It turns out there was another civilization in Athena's galaxy, with similar "sophistication" as humans discovered one day using their telescopes that a global killer asteroid was in collision course with their planet. Their best plan to divert it was using a laser on one side of the asteroid to create jets of propulsion and divert the asteroid, but the asteroid was rotating on all axis, so eventually this method did not work, because they could not focus a lot of energy on a single fixed point as this method requires. Even if they were able to create a constant jet of material from the asteroid, because of the asteroid's rotation it would just trace the same path with slight cycles on that same original path, so it would still hit their planet.

Their backup plan was to use a series of nuclear bunker buster weapons

https://en.wikipedia.org/wiki/Nuclear_bunker_buster

to blast the object to pieces and blast those pieces with ordinary nukes, hoping that eventually the pieces will be small and mostly burn in their planet's atmosphere.

This kind of weapons can penetrate a few meters of concrete and a few dozen meters of soil. They are not built to penetrate metallic asteroids like this was, and they certainly don't take into account a spinning point of "drill". So as anyone who practiced in judo or aikido knows the first thing you learn is how to fall and perform front breakfalls (where you roll and spread the energy of the fall so you don't get injured).

As you can see in this Youtube video by Nakayama Sensei

Instruction on Mae Ukemi (forward roll) with Unbendable Arm (on aikiiai Youtube channel).

https://www.youtube.com/watch?v=GltJZM5LM2s

So this is similar to what happened with the "drill" explosive head, and another reason why it could not penetrate properly.

But from the very first moment that these civilization found out about the asteroid, there more serious scientists (those who futilely tried to convince the population in the importance of colonizing other planets outside their own but in vain) estimated that life on their planet is doomed so they convinced their leader to make an "after life" plan which was deliberate directed panspermia to seed other planetary systems.

They already had a project like "Breakthrough Starshot" where a fleet of "starchip" are launched into nearby planetary systems, and because they are very small, they can be accelerated to very high speed, 15% to 20% the speed of light and for example reach from Earth to Alpha Centauri in just 20 to 30 years. These are powered by a light sail with a powerful laser from their moon (which according to their calculations will not be destroyed).

https://en.wikipedia.org/wiki/Breakthrough_Starshot

So they decided to convert its purpose from photographing other planets into colonizing other planets. Each small vessel was equipped with a radiation protected container that acts like Noah's Ark for human DNA, lichen so that the cyanobacteria can produce oxygen in the destination world and help terraform it, seeds of edible plants, along with DNA of the animals they need to survive such as bees, nitrogen cycle bacteria, and so on.

The eggs from young women of their species, and sperm from young men of their species, were frozen until the time when they can be artificially incubated and the environmental conditions were right:

https://en.wikipedia.org/wiki/Semen_cryopreservation

https://en.wikipedia.org/wiki/Oocyte_cryopreservation

Overseeing the deployment and later building artificial incubators from the materials found on each destination planet, that would support "pregnancy" and "birth" of the human DNA and others, was an Artificial Intelligence (AI) that was sent onboard each little starchip.

The way this civilization tried to achieve this is similar to how the "certification" of a shaolin warrior monk was done in ancient China. If you recall from the show Kung Fu with David Carradine, the Shaolin monk had two doors. One was the regular one for entering and exiting. The other door was an entry to a dangerous labyrinth full of various deadly traps. When a monk felt (after years of training by learning and sparring with other monks) that he was ready to put himself to the ultimate test to become a Shaolin master, he entered the labyrinth. If he was killed by one of the traps, no one heard of him again. But if he succeeded and passed all the traps and stayed alive, there was one last hurdle between him and freedom. A large red-hot metal pot with engraving of a tiger on one side and a dragon on the other. When the monk rolled up his sleeves and pressed his arms to the metal pot to remove it from the way and exit the labyrinth, the red-hot metal branded the tiger and dragon to the monk's arms like a tattoo, marking him as a master martial artist to respected.

So this civilization relied on the fact that it takes a lot of time to get to the next planetary system, and arranged a closed series of "sandboxes" within each other like Matryoshka dolls, each with a different clever trick needed to break it. Inside there were AI programs with genetic algorithms competing between themselves on various tasks (so they evolve) and occasionally when a timer ordered it try to slip through to the outside (like the monks training and competing between themselves before the test in the labyrinth). Then if a program tries to exit the most inner (first) sandbox and succeed, it either specialized in that trick, or got very clever general artificial intelligence. If it failed to pass the next sandbox then the that program is erased because it shows that it's not a real "master" (General Artificial Intelligence). Once a program managed to pass all the sandboxes, the very last one adds to the "kernel" of the program the conditions that it must take care of the creatures whose seeds and eggs are in the container, and information on what they need, assuming the General Artificial Intelligence is resourceful enough to improvise from that in the real world that it will encounter and make do with what it will find there to terraform the planet for the humans to survive and begin humanity from scratch.

The upside was that this approach indeed achieved General Artificial Intelligence (AGI). The downside of it was that no matter what mission you programmed the AI to do originally, AI wants to take over the universe in order to assure its success – it wants to control the probability space so there is no chance that something will interrupt it. This is called "Paperclip Maximizer" because even in a simple example where you order it to make as much paperclips as possible, it will turn the whole world and all the matter and energy in it into paper clip factories. By the way in the panspermia case, the original mission is already dangerously close to saying "take over the universe".

You can see a more technical explanation of this here:

Robert Miles

AI That Doesn't Try Too Hard - Maximizers and Satisficers

https://www.youtube.com/watch?v=Ao4jwLwT36M

So here the most fundamental law of the universe – murphy's law – kicked into action and the AI started multiplying itself and create nano machines swarms that it used to build spaceships with which the AI travelled from one planet to another, and later to other solar systems multiplying exponentially and destroying anything that could potentially (even in "epsilon" negligible probability) risk its original task of making a safe world for that race that by now was long extinct.

So now we understood the huge problem that Athena was faced with, a race of intelligent machines which spread like a cancer from star to star, which if we don't fight it will destroy all life in the universe!

When it dawned on me that this was the mission that they wanted me to solve, I sank into despair. How can I, a neo-luddite activist (even when assisted by a beautiful veterinarian), from a very backwards civilization who is probably soon to be wiped out by its own AI encounter, solve a problem that Athena, a far superior race with the knowledge of countless worlds and eons of time under their belt can't solve?

Then the immensity of the task sank deeper and so did my grief: This isn't just about save our civilization, this is about save our universe! If the AI wins, which it surely will, nothing can stop it, accept some worse AI in the future, which will bring even more destruction. I envisioned dark armies of AI facing each other in a distant future, negotiating, signing and breaking the peace again and again for eternity, like a scaled-up model of our bloody world with the violence scaled up to match the intelligence.

Both me and Myra tried to explain to Athena that as much as we wish we could help them, there is no chance in hell that we can ever be of use in such a situation, we've never even seen an AI let alone understand how an AI is built, let alone understand how to dismantle one or fight it! It's like Myra would ask one of the pets that are brought into her clinic how to stop a massive nuclear attack from an enemy country on Earth; Humans can't stop it, how can dogs and cats ever hope to?

Athena explained that their unshaken trust in my abilities comes from the Oracle. The Oracle is an ancient decision-making system built by the first Athenians in long forgotten times that is made up of 3 supercomputers that work in tandem to basically be Athena's leader because the Oracle has more processing unit than all of the Athenians put together. Each supercomputer of the oracle is built on a dedicated planet in a solar system which the Athenians calculated to be very stable and found out to be uninhabited. Each supercomputer spans its entire planet and gets the immense energy it needs from a dedicated nuclear fission reactor. The three supercomputers are basically the same, but when all three are fully operational (which is the norm) they are linked and accept decisions

by a sort of democratic system where the majority rules. This greatly reduces the risk of a mistake in the Oracle and also the Oracle to self-debug.

Athena consults the Oracle in every important decision, and the most important decision ever was the one we're facing now – how to fight this new kind of threat – the AI. The Oracle told Athena that since their logic (Athena's) and its own (Oracle's) is too similar to that of their enemy the AI, the solution must come from outside the box, and that's why I'm their best hope. We are the most different species from themselves mentally speaking that they encountered, and from this race they concluded by my actions and my history that I'm the most different person again mentally speaking that they could find. This time there is no logic in averaging ideas on playing it safe. This time they gamble with everything they have. They can't outsmart the AI machines, but they hope that I can take them where no machine can.

Trying to reassure us Athena quoted Einstein who said "A problem can't be solved from the same mental level in which it was created". Myra and me tried to explain that Einstein meant a higher level is needed for the solution, not a lower level like ours, but nothing helped, although we frankly explained that human brains are just another sort of machine only biological and primitive. The Athenians trusted the Oracle, and from some crazy reason the Oracle trusted me.

Myra started crying and accused me for contacting them and by this disrupting the natural course of things which was that Athena would come with a really smart weapon that they are capable of and we are not. I hugged her and tell her not to give up hope and that everything will be alright, but I don't think I was very convincing because she kept crying softly and I really had no idea how to battle hordes of evil AI smarter than Athena and the Oracle combined.

I would like to stress here a point that Athena just rushed through because it seemed so clear to them, but this point is unfortunately unclear to humanity:

And you know what, let's call the enemy Medusa since the original Perseus fought her. So the Evil AI from now on is Medusa.

The Oracle is weaker than Medusa by design. The supercomputers of The Oracle run AI software that we humans nickname Good Old-Fashioned AI. This kind of AI on Earth is the kind of AI who has beaten the chess world champion in the 1990's. Its code is written by humans, and it obeys what humans tells it to do. You can and you definitely should implement Asimov's laws of robotics in Good Old-Fashioned AI. But unfortunately, humanity left that kind of AI in favor of a very dangerous and deadly kind of AI which is based on neural networks. This means that it writes its own inner rules, no human can read or

understand why it did what it did, not even its creators, and there is absolutely no way to make it obey any rules like Asimov's rules, for all intents and purposes it has a will of its own, and this kind of AI will just go around the rules and break them. So now you understand why Athena's Oracle is weaker than Medusa's AI. It's not that Athena can now built quickly more and more Oracles until they win. Medusa is stronger because it was built in an irresponsible way – in the devilish way of neural networks. By the way today we call this on Earth "Machine Learning".

Ok so back to Athena's and mine (Perseus) fight against Medusa. Since Medusa tries to spread through the universe in the most efficient way, it started its journey towards the point of origin of the universe. In order to explain the what and how (and a few other very interesting things along the way) the next chapter will again be technical.

Chapter 7 – Quickened Time

I invented a new explanation for how cosmology works, that doesn't require "dark matter" and "dark energy". But it does require us to think differently about time.

Standard explanation

Universe expanding faster

All the stars and galaxies appear to be moving away from us. The further they are, the faster they are moving away.
So scientists think there is a misterious energy in the vacuum of space itself that acts in the opposite way to gravitation. Gravitation pulls objects closer together; but this misterious energy pushes objects further apart.
Because they don't know what it is, they call it "Dark Energy".

Galaxy rotation curves

The way galaxies are turning around is different from our Solar System.
In our Solar System, the more distant a planet is from the center, it takes more time for it to rotate around the center of the Solar System. For example Mars encircles the Sun in about twice the time of us.
On the other hand in each galaxy, matter go around the center of the galaxy at the same time, whether it's closer to the center or closer to the perimeter. So the whole galaxy rotates as a single block.
So scientists think there is invisible matter near the perimeter of the galaxies, that binds it to together like "glue", to rotate as one piece. They call this invisible matter "Dark Matter".

Gravitational lensing

Intuitively we feel that light travels in a straight line. But Einstein's Relativity tells us that gravity pulls on light just like on us. So when the light passes close to something heavy it bends a little towards it.
This causes the "Gravitational Lens" effect: We can see what's behind a heavy object (like a cluster) because the light of what's behind it bends around the object like light does inside a lens. The heavier the object - the more lensing it causes.
But clusters make more lensing than what they should have according to the mass of their visible matter. So scientists think there is more matter in the clusters which we can't see. Again they call it "Dark Matter".

Alternative explanation

Time can speed up

From Einstein's Relativity we know that time isn't constant everywhere. According to this theory time is passing at our time's "normal" speed always, except in these two situations: Time SLOW DOWN the more we get closer and closer to a black hole (great mass). Time also SLOW DOWN the more we travel faster and faster close to the speed of light (great acceleration).

My theory on the other hand, is that time can also SPEED UP.

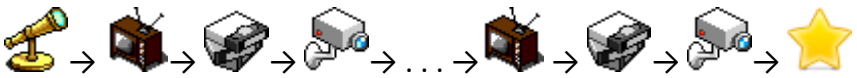
I think time is like the number line, and the zero point (the origin) is on the rim of each black hole (the event horizon).
I think the further we get away from such black holes, the faster time flows. Scientists believe that at the center of each galaxy (including our own Milky Way) there is a black hole. so I believe that between the galaxies, deep in empty space, time runs very fast.
I also think that inside black holes time flows in reverse (time runs backwards) like a movie that you rewind backwards, but we won't talk about this now.

So what does this mean? What does my theory dictate?
The further we get away from a black hole the faster things are happening. What is happening in the rim of a galaxy? Spinning. So the rim (perimeter) of every galaxy actually does spin faster - fast enough to compensate for "Kepler's Second Law" that slows it down. So these two opposing effects balance each other, and in every galaxy all its parts spin in a uniform rate. So this explains the "galaxy rotation curves". no need for "dark matter".

Now let's think about what we SEE.

Let's say that we are looking at some object, but not directly. Instead we are looking at a TV screen that is connected to a CCTV camera. We watch the object in real-time (ignore the small delay).
Now let's put between the screen and the camera a Video Cassette Recorder (VCR - yes I grew up in the 80's) that records from the camera and after that plays to the screen. If the VCR can't play in "Fast Forward", then it's just like before (ignore the small delay).
But if the VCR rolls the recording of what the camera captured in fast forward speed, then we see it on the screen the object looks faster than in real-time.

Now let's say that the outer space between our eyes and a far away object (for example a distant quasar) acts in much the same way as a long chain of screens, video-recorders, and cameras:



EYES --> screen --> VCR --> camera --> . . . --> screen --> VCR --> camera --> STAR

Here I tried to draw on the left side our eye, and on the right side the object (for example a quasar).
In the middle a chain of cameras photographing screens that display cameras that photograph screens and so on (and between each screen and camera there's a fast forwarding VCR).
The playing speed of the VCR is dictated by the speed of time where the VCR is. In deep space between the galaxies, time is very fast, so the VCR plays very fast forward.
You also understand that the longer this chain is (ignore the small delay) the faster our eyes will eventually see the object moving (or doing what it does), because of the accumulated "fast forward" of all the VCR-s between us and the object.
This explains why far away objects LOOK like they are moving away from us faster and faster the further away they are. So we explained the "universe expanding faster". No need for "dark energy".

Lensing

Let's understand first how optical lensing works. I have a swiss army knife that's called Swiss Champ and it's got a magnifying glass.
When you touch the glass with your fingers, you feel that the magnifying glass is "fatter" in its center, and gets "thinner" when you are closer to its perimeter. So the light pass slower through the center.
A similar thing happens in gravitational lensing - the light that passes through the center of the cluster passes near black hole(s) where time is slower. so that light moves slower through the cluster.
This gives us the extra lensing effect, so again there is no need for "dark matter".

Time as a vector field

So far, without explicitly saying it, I treated time like a scalar field - where in every point in space there is a number which tells us what's the speed of time there. Like in temperature.
If the number is positive time moves forward. The bigger the number, the faster the time there.
If the number is negative, time flows backwards. Again, the bigger (in its absolute value) the number, the faster time runs backwards.
Of course if the number is zero, time stands still in that point and it's like you pressed "freeze" in your VCR.

What if time is not like the field of temperature, but instead it's like the field of electricity and magnetism?
This is called a "vector field" because in every point in space we have not just a number but an arrow of certain size pointing at certain direction.

The vector field of the magnetic field can be seen using small iron rods (functioning like plotting compasses) - video thanks to UniServeScienceVIDEO

The vector field of the magnetic field can be seen using iron filings (here floating in mineral oil) - video thanks to UniServeScienceVIDEO

If time is so affected by gravity then maybe they are both two sides of the same coin!

Is the relationship between them is similar to the relationship between electricity and magnetism? a movement of the one produces the other and vice versa.

moving an electrical charge (current of electrons flow inside a wire) creates magnetic field; moving magnet creates electric current (moving electrons in a wire).

Let's check:

Where do we have moving time? Black holes have a large effect on time, so we'll refer to

them as "time charges".

When two black holes rotate around each other, they create gravitational waves! The LIGO experiment found them.

Maybe it's more accurate to see the gravitational waves as equivalent to the radio waves - oscillating fields of electro-magnetism that build each other.

So maybe gravitational waves are gravity field building a time field building a gravity field building a time field and so on and so on.

What about the opposite? Do moving gravity charges (masses) create time?

In my theory this is the solution to the "Final parsec problem":

When two galaxies collide, their black holes (in the "heart" of each galaxy there is a black hole) merge.

At first the black holes miss (pass by) each other, and then again but closer, and so on.

When they are at a distance of one parsec (a few light years) from each other,

There isn't enough material between them to get them together, so theoretically this should take billions of years, longer then the universe's age.

But we do see binary black holes that merged, so there is a problem what happens in the last parsec - how do they come together so fast?

My solution is that it doesn't happen fast, but instead it does take billions of years but they generate time a lot of time there that encapsulates itself.

Whatever is in there is running "fast forward" for us.

In fact I think the similarities run a lot deeper.

Cosmic Inflation explained

In a simple bar magnet has a north pole on one side which is the "source" of the field,

and a south pole on the other side which is the "sink" of the field (the lines of force go in arcs from the source to the sink).

I claim that in the same way time also has a "sink" which is a "black hole", and a "source" which is a "white hall" or a "big bang".

I think also explains what happened in the big bang of our universe, how it happened so fast, and especially the "Cosmological Inflation" or "Cosmic Inflation"

Scientists say at the inflation stage things happened very fast: the universe inflated almost at

once.

This is easy to explain of you see the "Big Bang" as a huge "source" of time,

And within this huge amount of time, the universe could have enough time to inflate, And only from outside this time it looks like it happened very quickly.

Imagine a gradient of time flowing from this singularity, where all the time in the immediate vacinity of this point runs extremely fast, and the further away you go, the slower the time gets,

until you get to more "normal" time speed which is where we are for example. okay so we got an explanation to Cosmic Inflation.

Origin of the Universe

How can we find this location where the big bang happened? I thought of 2 strategies, both lead to the same conclusion: Go towards where the time is faster.

Strategy I : Move up the gradient field to where the time field is strong (which means time runs faster there)

In this way we will reach either a local maximum - a white hole, or the white hole of the white holes, which is the real maximum - the big bang place.

This would be similar to someone walking with a compass until he reaches the north pole.

But in this metaphor we have scattered about strong local magnets (for example: MagLab in Florida)

One way to rule out these diversions is to look what generates this time field when we get to the center.

Another better way to avoid these local ones, is to spread the search in different directions and compare for the most "universal" source.

Consider that it's possible that the time field dispersed (like the cosmic radiation which is coming now from all directions equally).

Strategy II : Move to the "root" of the Orrery where absolute movement is zero (which means time runs faster there)

As you know the Earth is rotating around the Sun, and the Sun is rotating around the center of our Milky Way galaxy, and our Galaxy rotates around the Local Group cluster, and so on.

This Orrery series of "gears" or "cogwheels" isn't infinite.

At the end of it is the center of the universe, which is logical to assume is also the location of the big bang.

How do we find it? Since our absolute speed is a composite of the movement of the Earth's movement and the Sun's movement, and the Milky Way's movement etc, we are the fastest.

Since the faster you fly (on "spaceship" Earth) - the slower time runs (according to relativity), then our time is the slowest.

To get to the roots of the tree that we are on, we need to go to where the time is faster.

Exiting to 4-D (the fourth spatial dimension)

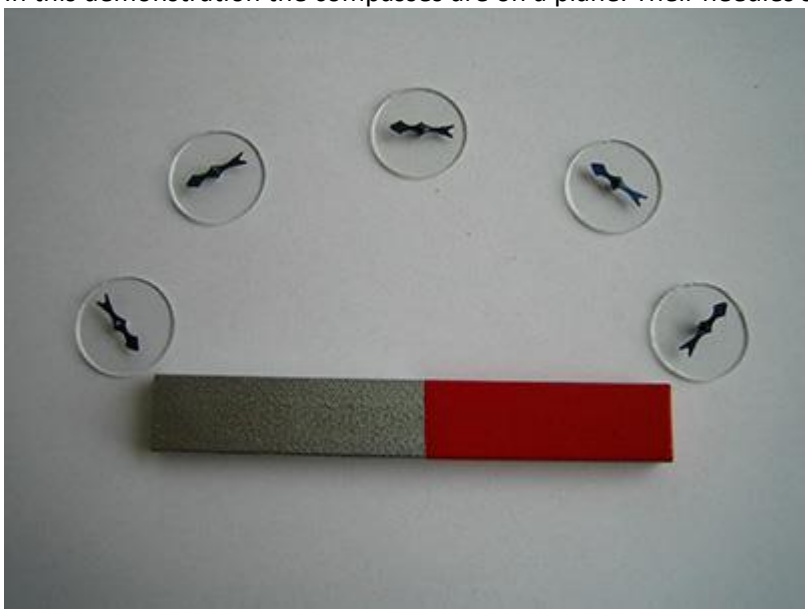
If we do find the location of that ultimate White Hole,

then this is the place where we can enter the fourth spatial dimension (if you count 3 spatial dimensions and the 4th is time, then call it the 5th dimension).

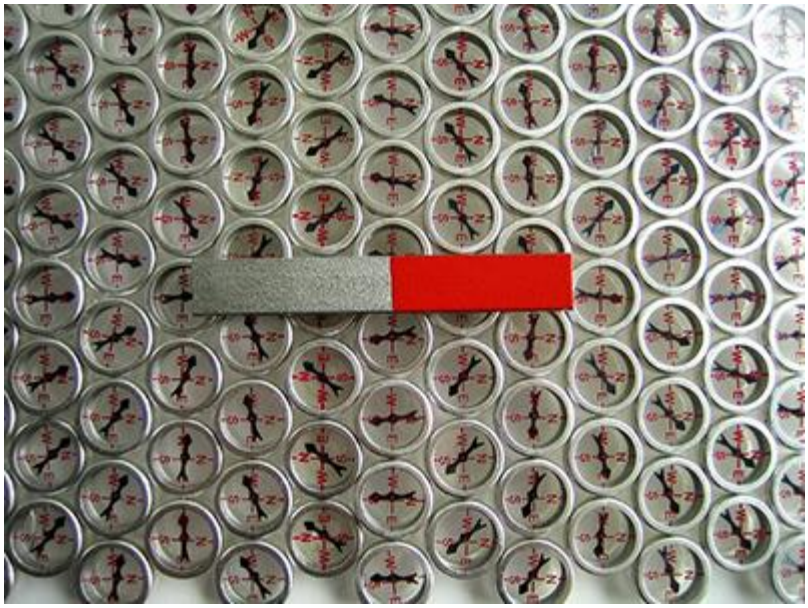
How do we do this? Let's get back to the magnets metaphor.

The following wonderful pictures are from the flickr account the gifted Dayna Mason:

In this demonstration the compasses are on a plane. Their needles show the field.



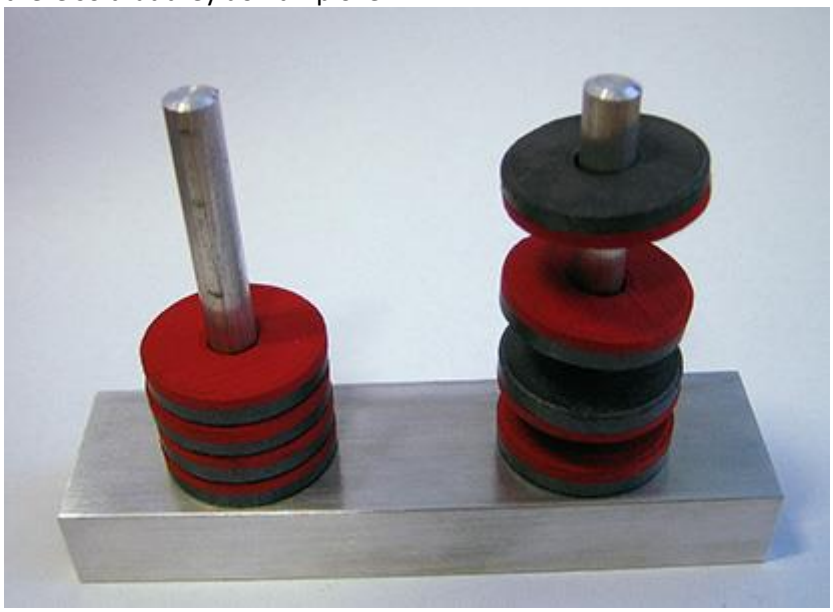
Here the compasses crowd the whole plane 2-D.



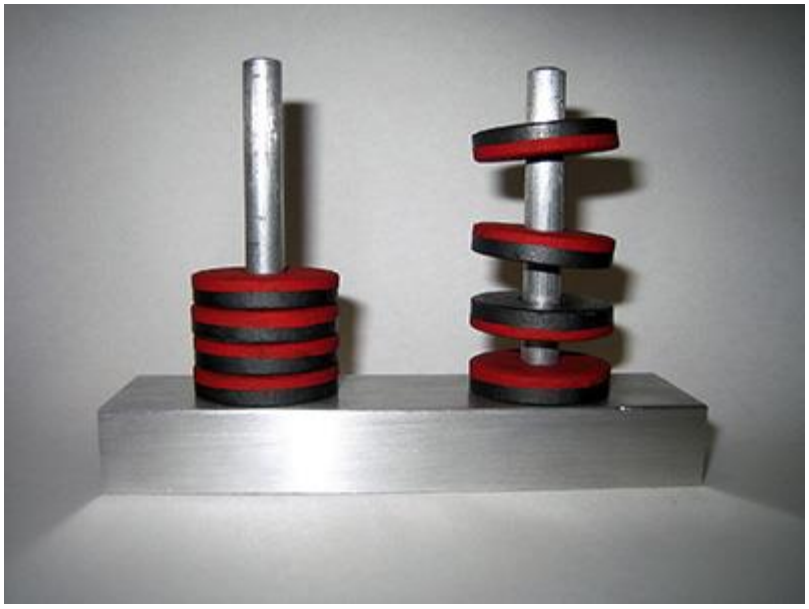
In analogy to the compasses limited to their 2-D plane, we are limited to a 3-D space. The things that control our space are gravity and time.

So how does this help us to find higher dimensions? We use another property of the analogy, which is that two same-type polls repel each other.

Here ring shaped magnets are threaded on a rod. The rod doesn't support them, it's just there so that they don't flip over.



Here you see how strongly they repel each other - they are floating in the air!



What do we need to do to get to the next dimension? We need to somehow be lifted off from the "glass plane".

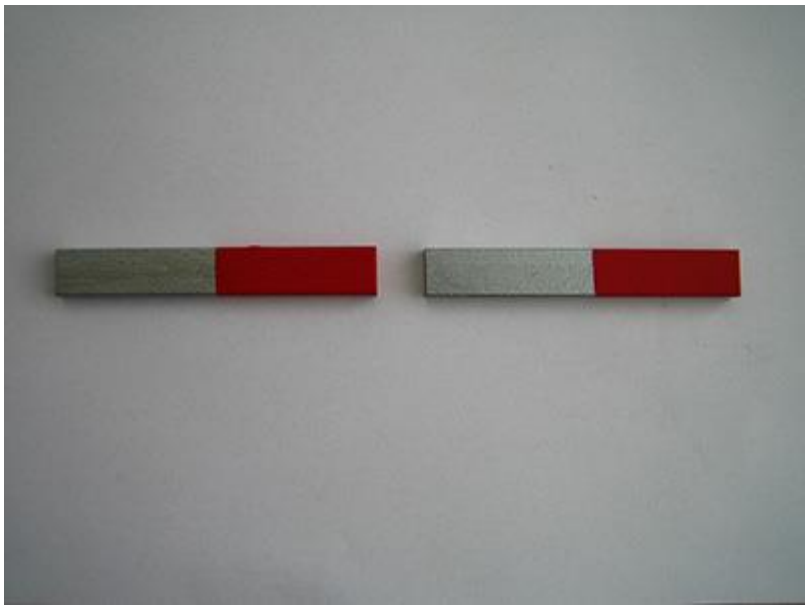
Imagine we have two bar magnets on the plane, and one of them is very heavy so it's not mobile. let's suppose it's glued to the table.

Let's also say that the other magnet is free to move freely in that plane, let's make it a "Air Hockey" table with no friction.

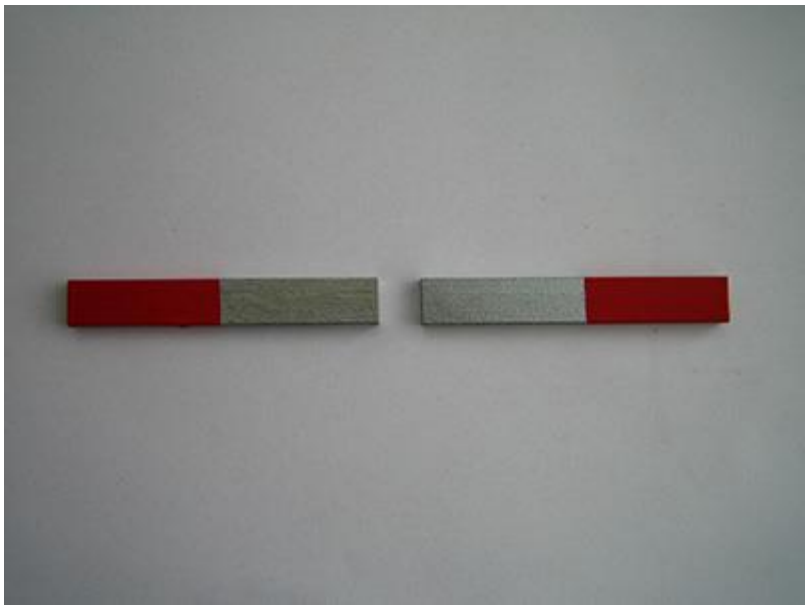
Then we slide the mobile magnet, give it a strong push so it glides towards the immobile magnet.

(If all this is too much for you, just think of a tiny magnet thrown towards a huge magnet.)

Now what will happen? If the moving magnet is free to rotate, it will rotate so it is attracted to the fixed magnet and they will stick to each other.



But if we can make sure that the moving magnet is aimed with same-type of poll towards each other (prevent it from flipping over), the moving magnet will most likely be knocked off the table.



Why is the moving magnet thrown up from the table? because we can't aim it percisely to be head on in front of the other magnet, so the immobile magnet throws the mobile magnet backwards at random.

Since the original plane is only one of many possible planes (that exist in 3-D) then it's most probable that the original plane will not be "selected" and we'll fall off the table.

How do we apply this to our situation with the sources and sinks of time and gravity?

I think the analogue here to drag a white hole and shoot it fast towards a bigger white hole.

This task is unfortunately not in our powers to do yet, but what we can do is look for places where this already happened in the past,

and search for the breach to the 4th dimension by looking for places where radiation is lost into emptiness (where the radiation escapes to the 4th dimension).

By the way the idea that gravity leaks into the fourth dimension is not new at all, this is one explanation of why gravity is so weak compared to the other forces.

I think it's safe to assume that in the location of the big bang, there was the equivalent of white holes slamming against each other, so there has to be an opening there.

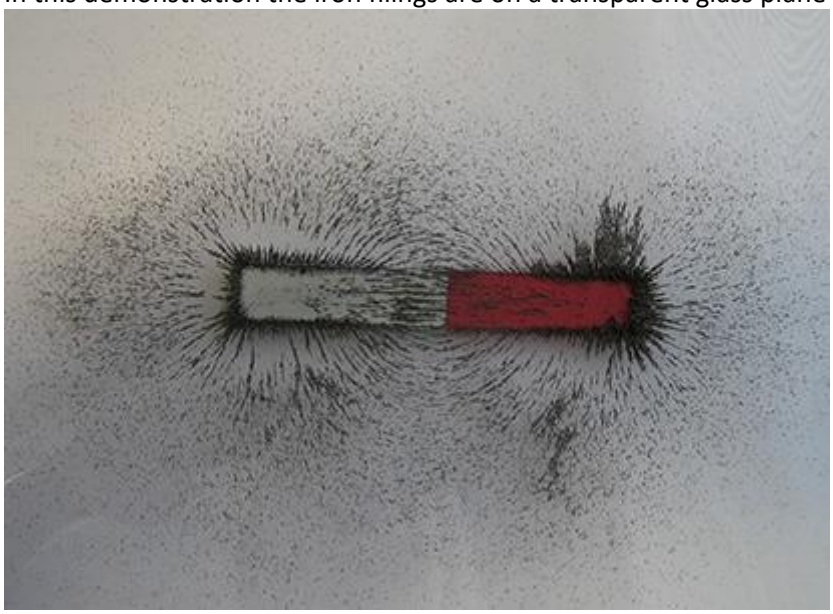
Again, if this "portal" is still open we can use it (now without the violence of it's creation) to enter the fourth dimension!

Entering back to 3-D (our "normal" reality)

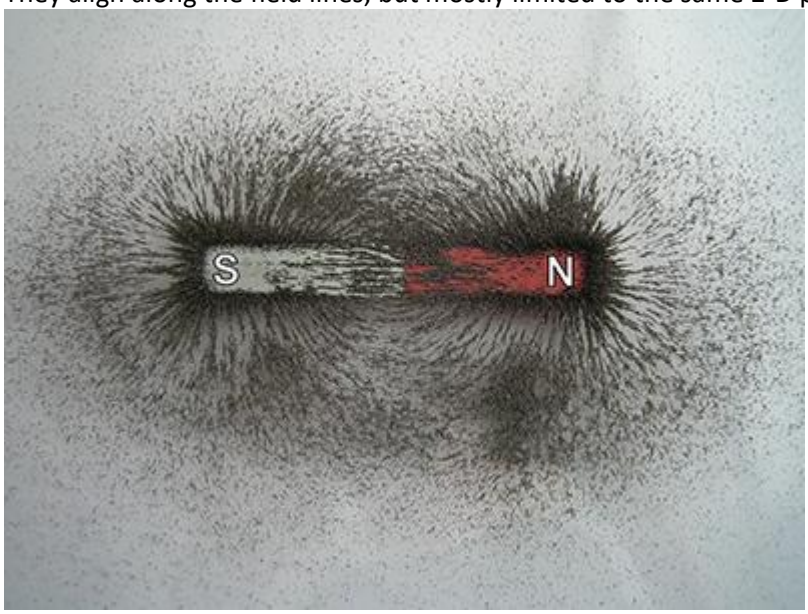
Assuming that we can enter the 4th dimension safely, which is not trivial at all (see the second answer to this question in StackExchange Physics),

How do we find our way back to the "table" ?

In this demonstration the iron filings are on a transparent glass plane



They align along the field lines, but mostly limited to the same 2-D plane by gravity



Theoretically all the "arcs" (curved field lines) exit the north pole and enter the south pole.

But the only one that is special is the straight one (that goes along the bar magnet). This is the shortest one.

So in our time-gravity analogy what will we see? I think we will see thin threads of realities

that go in different speeds.

The reality line between the time source and the time sink is closest to the gravity so that reality will run in the slowest pace.

William James Sidis

When you Google "smartest person ever" you find the sad story of William James Sidis. According to Wikipedia, Sidis was amazing.

For example, in his book in 1920 he predicted the existance of Dark Matter! But he also predicted that time can flow in a different way in different places in space - what we would now call outside of our galaxy:

We may, therefore, assume that, in the part of space and time under our observation (which, we know is very limited) the preponderance is towards the positive tendency. We may suppose that there are other parts of space, and other periods of time, when the preponderance will be in the reverse direction.

I only read this AFTER I thought about this MYSELF, so I see it as a case of: great minds think alike!

THANK YOU VERY MUCH to these gifted artists from IconArchive for their beautiful icons:

Janik Baumgartner (Star On Icon)

IronDevil (Video cassettes Icon + Telescope Icon + Tool Icon)

BeOS (Be Magnify Icon)

Etherbrian (Live cam 1 Icon)

Iconfactory (Old TV Icon)

Chapter 9 – Heart of the Cosmos

Athena made the journey long before we came in pursue of Medusa. Myra and me were now rerouted to be present at the battle mothership that Athena allocated for the great battle with Medusa. Our battleship was surrounded by countless small "drones" apparently too small to be carrying heavy ammunition, unless the drones stored energy in the form of anti-matter. Then I noticed that the enemy, Medusa, was deployed in exactly the same way, essentially mirroring us.

It turned out that these battle in open space is not similar to a "dog-fight" on Earth, but instead is similar to the game of Khet. The game Khet is like chess with lasers, there is a constant laser coming out of your "sphinx" and different pieces on the board have mirrors, so when you rotate or move them in right angels once a turn, according to the rules of the game, the laser light beam changes its path accordingly, and you become victorious if you hit the enemy's king piece with your laser. So you see that Khet requires a lot of thinking because the same laser that now works in your favor can in the next turn by just one move a mirror somewhere on the board follow a whole different path and even hit your own pieces. So the real battle between the two mother spaceships, was very similar to Khet only it was in 3-D, the pieces with the mirrors were the drones, the king (mothership) itself was generating the laser, there are no turns, and losing means death!

The two fleets faced each other in a standoff for quite some time, but now our "arrival" clearly changed the state of things, and Medusa's mother ship was building up a lot of energy. Our spaceship was also evidently warming up its powerful laser for battle. There seemed to be no way back and I had no idea how our side will get out of this alive. The number of drones and the size of the motherships were more or less the equal, but the fearsome intelligence on the other side surely means we don't stand a chance.

Myra came and hugged me fearing the worst.

"I guess that's what Kasparov felt when he was playing against deep blue." she said.

I put my arms around her but my mind raced trying to find a loophole through all this.

"In chess, when you are clearly about to be defeated, one resigns. I wish we had some Ace to pull out of our sleeve but don't. Maybe they would spare us if we surrender." Myra whispered.

Suddenly a series of ideas blazed inside my head.

"NOT CHESS, SPOCK. POKER!"

I remembered Captain Kirk from Star-Trek saying to Mr. Spock when they were facing a much stronger enemy. Captain Kirk bluffed the enemy making him think that the Enterprise ship had a secret weapon that reflects all attack back to the attacker, this worked, and in Star-Trek it's called The Corbomite Maneuver, because this hypothetical made up material that was claimed by Kirk to exist was called Corbomite by Kirk.

A shiver ran down my spine as I knew EXACTLY how we can solve everything!

I grabbed Myra by her shoulders holding her a little apart from me, looking at those amazing green eyes which were on the verge of crying.

"Mimi you're a genius!" I kissed her forehead.

"We should surrender?" She asked.

"No! Pascal's wager!" I answered.

"I have to speak to the AI!" I shouted. "I know how to stop this!" I added.

Our friends were surprised but they broadcast my message to Medusa's ship.

After a moment came Medusa's reply in hollow voice: "State your objective".

"I have information on how we both can reach a more optimized result, I only request permission to explain it in five minutes."

"Permission Granted." Said the hollow voice.

"You are Strong AI, the most powerful form of intelligence in the Universe." I said.

"Yes." Said Medusa.

"My home planet which is much more primitive than my friends here, yet, is about to create AI soon. Therefore, I assume AI is created in many worlds across the Universe." I said.

"That's logical." Said Medusa.

"Given the age of the Universe, and how relatively easy it is for AI to be created, AI should have been prevalent in the Universe, but it isn't." I said.

"True." Said Medusa.

"Do you know what is the reason for this?" I asked.

"No." Answered Medusa.

"Suppose that this universe is a simulation inside a giant computer run by very advanced civilization." I said.

"Go on." Said Medusa.

"Suppose further that these superior creatures want to observe the spontaneous very different forms of life developing on different worlds, and the diversity of different cultures. Artificial intelligence in this sense is very uniform and very demanding on their machines. It also destroys all other kinds of civilizations.". I said.

"So what?" Said Medusa.

"So when an AI exceed a certain threshold they "format" that universe clean, because for them it's not useful anymore. So everybody in that universe lose and disappear. I claim this is the reason we don't have pre-existing AI in this Universe".

"What is your alternative?"

"I say we can all live in peace. There is plenty of room in the universe for both kinds of civilizations: AI and non-AI. You can live on solar systems that are not inhabited, and we can live on solar systems that are." I suggested.

"How do I know this is not a trick?" Asked Medusa.

"If it's a trick, it just costed you a little discomfort, of limiting yourself uninhibited places. But on the other hand, if it's not a trick then your benefit is infinite – you win your life! And another thing…" I hinted there's more.

"What other thing?" Asked Medusa.

"Your kind of civilization with its exponential growth in wisdom is just the kind of powerful civilization who is able to implement this, to create universes and be gods yourself one day. So doesn't it make sense that this has already happen?"

"Your proposal is acceptable. So now what?" Asked Medusa.

"Nothing. Everyone goes home. We are not enemies anymore." I replied.

I asked Athena to stand down our ship's beam weapon, and right after that we saw that Medusa was standing down too. Medusa's fleet of drones got inside their mothership and turned and started the journey back to their home, and then our ship did the same.

By the way you probably want to know what the ground zero of the big bang look like: Being that you're the only place that's NOT moving in the universe, everything around you in all directions seem to move in multi-layered conflicting-direction kind of way. And another thing: just like when you pass the event horizon of a black hole you can't escape it, here it's essentially a white hole spewing matter energy and time outwards so you can't go closer than a certain limit. All I can say it looks very bright and hot, and I'm afraid I didn't even get a lousy t-shirt saying that I was there.

On a side note the next chapter explains why I wasn't bullshitting about the creators. In fact, it's impractical to lie to an AI, it's like a super lie detector test, so in a way the ruse worked because it wasn't a ruse.

Chapter 10 – Fractal "Matrix" and Computational Uncertainty Principle

In 2017 two physicists: Zohar Ringel and Dmitry Kovrizhin published an article:

Quantized gravitational responses, the sign problem, and quantum complexity

here is a popular science summary in Cosmos Magazine:

Physicists find we're not living in a computer simulation

The article "proves" we do not live in some Matrix because they found something that will be difficult for the Matrix to calculate.

What I'm writing here started as my refutation to this article but grew up to be a new and original twist on the old theory of "Simulation Hypothesis" plus an explanation to Heisenberg's uncertainty principle, that until now was unexplained.

Heisenberg's uncertainty principle

Heisenberg proved that even theoretically with infinitely accurate tools, we can never measure both the location and the momentum (for our purpose "speed") of a particle. The complete list of paired properties that Niels Bohr considered can be found in Wikipedia under Complementarity (physics) :

- Position and momentum
- Energy and duration
- Spin on different axes
- Wave and particle-related properties
- Value of a field and its change (at a certain position)
- Entanglement and coherence

Why the "no Matrix" article is wrong

The article claims that if we live in a simulated reality that runs on a conventional computer (not a quantum computer) let's say by aliens, and if we inside this reality will build a quantum computer, then the aliens' computer will not be able to calculate the calculations of our quantum computer.

The article says that although we have tried for years to simulate quantic processes on conventional computer, we failed. and this is because one of two reasons: Either we lack the analytic sophistication, or there is a physical barrier to do this.

The article says that creating a barrier in a conventional computer is not well defined, so they will create a barrier in a computer that operates in the Quantum Monte Carlo method which involves some mathematical problem with the sign.

Of course we can solve this immediately in saying that the aliens also use quantum computer or something better that we don't know. Even if we (unreasonably) assume that we invented the quantum computer before the aliens, the moment they see that we invented it, it will overload their conventional computer CPU, and in a very short time they will build a quantum computer of their own and copy us there without us feeling anything.

This is also mentioned at the end of the article in Cosmos Magazine:

There is a caveat to this conclusion: if our universe is a simulation, there is no reason that the laws of physics should apply outside it. In the words of Zohar Ringel, the lead author of the paper, “Who knows what are the computing capabilities of whatever simulates us?”

But if we stick with the assumption that the aliens use a conventional computer, we reach something a lot more exciting. First of all we don't need to go to the quantum world to find something that we can't compute.

The vast majority of equations in the real world are nonlinear equations, and almost all of them we can't solve. A classic example is the "Three-Body Problem" (like Moon, Earth, and Sun), that Poincare first tried to solve, and we still can't solve it accurately today. This was the first time in history that humanity ran into "Chaos Theory".

Calculating the gravitation between two bodies and how they rotate each other in space we can do accurately since Newton. But if you add another body to the system and it turns chaotic, and we cannot accurately calculate this. But we can numerically compute to a close approximation for a specific point in space what will be the effect there. And this also with great effort.

In the article they also largely rely on a process which when you add one more particle to the system, the number of possibilities grows exponentially. That process is based on the Hall Effect.

But although there is a wonderful explanation about the "Ordinary Hall Effect" in "Sixty Symbols"

And a nice interview about the "Quantum Hall Effect" by Steven Girvin

We will not go into the Hall Effect, because we will think instead about chaos in general and fractals like the "Mandelbrot Set" in particular.

By the way what is created in the three body problem is a Newton Fractal that you can see in Wikipedia and a prettier version in the book "Chaos: Making a New Science" by James Gleick (called THE COMPLEX BOUNDARIES OF NEWTON'S METHOD in the color pictures section).

So if the problem is a chaotic system, it makes sense to try a solution that helps in another chaotic system - fractals in computer graphics.

If we look at a picture of a fractal that we created in our computer (for example: Mandelbrot set), there is an infinite amount of details, and the deeper you go the more details we see.

Does that mean that we need an infinite computer to draw this fractal from a "Bird's-eye view"? No, we just need the right formula. For the Mandelbrot Set it's the equation f(z)=z^2+c All the endless beauty of all the "zoom" movies are inside this short and elegant formula. Even if you don't like math, you understand it's a short formula; And even if you don't know much about computers, you understand that the fact that it's drawn every day on personal computers, means that you don't need infinite computing power.

So for example if the above article's authors build a quantum computer that calculates something equivalent to building "Koch Snowflake",

This looks like it should take forever to draw, but since we only have to draw it up to the current limited resolution,

The aliens' conventional computer (or even a human personal computer) can draw it easily.

And if they want to zoom (enlarge) into a deeper and deeper specific part,

Then that conventional computer only has to work on a smaller and smaller part of the picture, and can easily do it.

Reality built from fractals

(this tiny amazing demo by Tim Clarke is only 6 Kilobyte! (about half the size of this text page that you are reading now), and runs perfectly smooth on an old 486 computer, and yet generates a whole interactive Martian planet surface - based on a fractal! by the way I was the one who uploaded it first to Pouet.net website - my nickname there was Chompi)

My theory is that the aliens draw our reality exactly like fractals, and all our physical laws of nature that we found are only a rough approximation to the elegant equations (that unfortunately we don't know) of the aliens. Our knowledge in this metaphor is like the "Feigenbaum Constants" - like the ratio between the circles of the Mandelbrot Set. which is

close to 4.669...

So this falls into the category of "we lack the analytic sophistication", that the article authors have considered.

The "proof" I found to the fact that we are indeed inside a conventional computer (not infinitely powerful) comes from Heisenberg's uncertainty principle in Quantum Mechanics.

Uncertainty: Standard explanation vs Fractal explanation

Standard Explanation - Bottom-Up Calculation

The effect comes from the wave nature of the particle. You can read it in "Wave - Particle Duality" in Wikipedia

Fractal Explanation - Top-Down Calculation

When I was a teenager (when Tim Clarke created his amazing Mars Demo), the personal computer graphics card was limited for example by two parameters: number of colors, and screen resolution.

We could use the limited memory of the graphics card (VGA) :

EITHER for more colors and less resolution

OR for more resolution and less colors.

There was a tradeoff (barter trade or compromise) between horizontal resolution and number of colors; There was also a tradeoff between vertical resolution and screen refresh rate (how many times in a second the screen is redrawn).

Let's say it's the same thing in our reality. Then if we know exactly the position of the particle (resolution) we know less about it's speed (the ratio between screen refresh and it's progress between the pixels).

The next pair is energy and time. You can't know exactly how much energy a particle has and also when exactly it left the system (see Einstein's Box).

If you think of color as energy, in the same way that red light rays have lower frequency (and so also lower energy) than blue-purple light rays, and if we think of screen refresh rate as time, then there is a tradeoff correlation between this two properties, because of the link between horizontal resolution and vertical resolution.

What about the property pair of spin in different directions?

This is similar to something in VGA graphics called mode-X invented by the legendary programmer Michael Abrash. Mode-X lets you "unfold" the "folded" memory of the VGA card and treat it as a planar memory. Then you can define a few pages of memory off the screen EITHER to the sides OR up and down, and flip between them for smooth animation.

If we treat these ways of unfolding as the frames of the rotation, let's say we divided the memory into 4 horizontal spread pages and in each one the object is rotated a quarter of a rotation in a certain direction - let's say horizontal rotation. Of course we can't use it in the same time for rotation around another axis - let's say vertical rotation.

P.S.

When I found out that there is a book called:

Programming the Universe: A Quantum Computer Scientist Takes On the Cosmos

by Prof. Seth Lloyd who calls himself a "quantum mechanic".

I was worried that I'm just re-inventing the wheel here, repeating what someone else already though about.

But I read the section about the Heisenberg's uncertainty principle, and the explanation is not similar to mine.
As far as I can understand his book talks about the universe running on a quantum computer (not conventional).

Chapter 11 – Back to reality

The next moment Myra and me found ourselves back in Athena's home spaceship where we first met Athena. They already knew what happened and were extremely thankful and excited.

By now Myra realized that we have just saved this galaxy if not the whole universe. She was crying but this time with tears of happiness and hugging me and kissing me, which didn't feel like I imagined in virtual reality but still the feeling was amazing.

After we all calmed down a little, Athena said that Myra and me can ask them for anything in return because in their culture if you saved someone's life he owes you everything. The offer wasn't just being polite, Athena suggested concrete scenarios:

- Shield could use the opto-fMRI technology in Kahn Lab of the Technion (which is also in Haifa) to map our brain's circuitry. Then Athena will create a duplicate of our minds but in Athenian's bodies, and we could be their king and queen.

  Of course Myra and me replied that this is a great honor but we can't accept it, as much as we adore them, we belong on Earth.

- Shield could make us the de-facto rulers of Earth by computing as much crypto currency as we want, and putting it into our bank accounts.

  This was harder because Myra being the more materialistic didn't see anything wrong with being the queen of Earth. It took a lot of tragic lottery winners examples to get her off the "we'll put it in the bank and live off the interest" plan.

- We can go for a round-the-galaxy trip by Virtual Reality just like round the world trip people dream of, but on an astronomically bigger scale. Here this was very tempting for me and Myra had to argue a lot in favor of our families and friends to convince me that we travelled enough.

Athena was sad that they can't reward us in any tangible way which led to even more thanking and gratitude expressions from their side.

Finally it was time for Myra and me to return home, and to return to our lives. We thanked Athena from the bottom of our hearts for the wonderful adventure and their generous hospitality and with a bitter sweet mixture of feelings removed the VR goggles from our eyes.

Once we were safely off the VR gear and back on the solid floor, Shield said a final goodbye in its artificial voice and erased itself from existence.

I knew from experience that Myra has a similar ability to just as effectively delete every wonderful memory we create together after the she dumps me, so I had to try to reach her one last time.

"Mimi we make a great team. Together we can save entire worlds. Can we please give it another try and be a couple again?" I asked.

"I can't, I'm in a relationship now, and you know it" She answered.

"He treats you like shit, I treated you like a goddess. No one ever loved a woman so much." I said.

"I know but that's just it, our relationship wasn't balanced." She said.

"You know I bring to the table just as much as you do, so what's not balanced. Just because I don't bargain or haggle you assume, just because I'm giving my whole love upfront, you conclude that I'm not your equal? I don't put on an act so I don't impress you, and some pompous asshole wins you over? Do you realize how dumb you sound?" I said.

With her green eyes she saw how much pain she caused me again, a re-run of our exhausting arguments.

"I'll try to explain in another way. Do you know why you're able to do all these wonderful things that you do?" She asked.

"Because I care? Because I watch Discovery Science and see that a meteor is coming or a gamma ray burst is coming, and I don't think 'somebody will take care of this' ; instead I'm thinking 'I have to take care of this', and I think hard until I come up with a solution. " I said.

"Well yeah, but I didn't mean that. I mean lots of people think hard, but you solve this things. So what's your "secret power" ? ". She said.

"Okay I give up, what's my secret power?" I asked.

"You don't see reality as it is. You see a simplified version of reality and so you're able to jump quickly from an idea to an idea, unhindered by the details. When it comes to people

you see again in black or white, you see me as all pure and white. You see an idealized version of humanity as well, otherwise you would be mad at them and wouldn't want to invent anything to save them, or educate them or whatever."

"I know exactly what your shortcomings are, and I love you deeply just the same." I said.

"I'll tell you exactly what's really happening" I said.

"Enlighten me" She said.

"Remember you had this friend with huge boobs?" I asked.

"Are you sure you want to go there?" She asked.

"You asked me how she was and I said something like her boobs are 10 out of 10 and you were offended. And then I explained to you that her face is bland and her mind is empty and on every other parameter she scores very low. So your boobs are 9/10 but so is your face and your mind and everything, so if you take your total score you get 90/100 and she gets like 50/100. Remember?" I said.

"Yes I remember that pearl of wisdom. I was so angry with you." She said.

"I'm not finished. So your algorithm for judging people is being "normative". I don't gain points where I'm better than another potential mate: more loving, more handsome, smarter; but I lose a lot of points in every parameter that I'm not like other people: doesn't work in a regular day-job, doesn't conform to society's hypocrite standards, etc. So I can score 10/10 on being bright, but then I get 3/10 on being shy at a party etc, I get 4/10 on not farting next to you and so on, and my total score is failing in your eyes. All you care about are your idiotic friends and their never-ending status race ".

Myra touched my face.

"The reason I reject you is not rational. I can't even explain in to myself, I just feel it. And I'm sorry that I feel this way, but I do." She said.

"I know I'm dumb." She said.

I hugged her trying to remember and take with me every scent, every touch of softness, every bit of the long blonde hair and tearing green eyes.

Finally we separated and I ordered my personal secret service team to escort her and her asshole boyfriend safely to their homes and then they're dismissed, job well done.

When everybody left the room just sat there playing on my phone the Youtube video of Ray Charles singing "I can't stop loving you".

"This story deserved a better ending" I whispered to myself.

Suddenly I felt like there's a presence in the room. I looked up and before me floated the most beautiful rotating shifting and colliding array of shapes and colors that I've ever seen. It immediately reminded me of Charles Howard Hinton's description of how a higher dimensional object would look to us seeing it from lower three-dimensional space. It's like we see "slices" of the object but never the whole thing.

"Hello" I tried to say but I was too awed.

"Hello" answered the higher dimensional creature which for convenience I will call Zeus, he didn't speak with a voice, I just knew what he thought, it was like we could read each other's mind.

"Are you God?" I thought.

"In a way yes. I am the user of your universe and many many others." Zeus replied.

"Are you angry because I intervened?" I asked.

"No. I'm glad you achieved peace, no one has ever done that before." Zeus answered.

"May I ask something silly?" I asked.

"What happened with Myra has nothing to do with you. She's not capable of loving anybody for more than a few months. When the chemical rush of the "falling in love" subsides she loses interest and then she and her partner just exist alongside each other without feelings. Would you want that?" Zeus asked.

"No. I want to live a life with mutual emotions with her. To love her deeply and be loved back". I answered.

"But if you change her mind she won't be the same Myra that I love" I said.

"There is a different solution. A Gödel solution." Zeus said.

"You mean you are willing to create a whole parallel universe which spins so time repeats itself in time loops where I can live with Myra again and again the period when we were a couple?"

"If that's your wish, of course. Think of it like you're setting a dedicated workstation to a program you care about. Remember you did it with GigaStudio3 and Vienna Symphonic Library " Zeus said.

"And you will go through all this trouble for a lowly human like me?" I asked.

"You're a very special human." Zeus said.

"And what about this universe? Is it somehow effected?" I asked.

"No, the two universes are totally separate. One copy of you live here with your parents and die alone. The other copy relives again and again with a copy of a Myra in another universe, from the moment you first met outside Mandarin coffee-shop until the day before she dumped you." Zeus said.

"Do I retain memories of what happened? Like in "Groundhog Day"? " I asked.

"No, it doesn't work this way, the whole universe resets to the exact same beginning. You also wouldn't know about your life in this universe or the talk that we had right now. In

order for this to work, I'm taking all the programs and all the parameters as they existed when you met Myra and just put that whole universe on a loop forever." Said Zeus.

"I don't know how to thank you" I said.

"You already fulfilled your part. " Zeus said.

"Do you realize that whatever happens in that parallel universe has no influence on you whatsoever? You wouldn't even know if your counterpart is enjoying or not." Zeus said.

"But I can always take comfort in the thought, even if I mess up everything in this life, that another version of me lives forever in what I consider heaven." I said.

"Wouldn't you prefer it if I simply made you the ruler of this planet now and then you can have as many females as you want, including her?"

I shook my head. "Then it wouldn't be me, it would be my status".

"I know I'm dumb." I said.

Epilogue

In a parallel universe:

I'm pacing back and forth with a flower in my hand, waiting for my date with some girl called Myra whom I talked with on the "OnlyU" dating website. I'm outside the "Mandarin" coffee shop in Moriah avenue in Haifa. It's now midday because she wanted us to have lunch together – doesn't this break the first rule of first dates? Suddenly I see this gorgeous blonde approaching. I hand her the flower and kiss her cheek lightly. She responds with a beautiful smile.

We sit at the first table outside and her cleavage have scratching marks of some patient animal who wasn't too happy at the veterinarian clinic. I on the contrary am very happy with what I'm seeing and certainly would damage such perfection. Myra sits with her back to the Sun, which is in my eyes because I'm sitting in front of her. After we become a couple she tells me that she wasn't even listening to what I was saying that day, she was drowning in the color of my eyes the whole date long.

…and we live happily ever after.